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THE
HEALTH AND WEALTH
OF THE
CITY OF WHEELING,
INCLUDING ITS
PHYSICAL AND MEDICAL TOPOGRAPHY;
ALSO, GENERAL REMARKS
ON THE
NATURAL RESOURCES OF WEST VIRGINIA.

BY

JAMES E. REEVES, M. D.,

CITY HEALTH OFFICER, AND AUTHOR OF A PRACTICAL TREATISE ON ENTERIC OR
TYPHOID FEVER.

“How out of the existing seed to raise races of men to divine perfection, is the final problem of public medicine.”—DR. FARR.


SECOND EDITION, ENLARGED AND ILLUSTRATED.

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NOTICES OF THE FIRST EDITION.

[*From the Richmond and Louisville Medical Journal, March, 1870.*]

"This is a most excellent publication. It is creditable to Dr. Reeves as a physician; it is creditable to the city which has placed in a position of immeasurable importance an officer so competent to efficiently discharge his difficult duties, and so able to reflect credit upon medical science and medical men. How rapidly would the profession of medicine be duly appreciated by the general public, if such reports were not exceptionally, but as a rule, disseminated? How necessary is it for physicians, in guarding the honor and welfare of their profession, as well as in preserving the health, happiness and prosperity of communities, to give their aggregate voice in the election of medical officers charged with the duty of preserving the health of States, cities, and towns? How rigidly should those be tried before the bar of medical and secular opinion, who, from wilful ignorance or disgraceful partizanship, elect those unfitted or incompetent to discharge the difficult and responsible duties devolving upon them? It is sufficiently deplorable when the unprofessional are guilty of such malfeasance, but when physicians (who are educated to appreciate the necessity of proficiency in a medical officer,) so far forget what is due to the honor of their profession, and to the safety of communities, as to elect, through despicable partisan influences, medical officers unqualified for their positions, physicians thus untrue to their profession should, by the members of that profession, be visited with the most scathing denunciation. Dr. Reeves's pamphlet is devoted to an examination of the following subjects: Importance of sanitary science; topography; streets, alleys, and drainage; sewerage; private dwellings; geological stratifications; ethnography; manufactories; diets, drinks, and habits; tobacco, statistics; hospitals; prisons; schools and colleges; libraries and places of amusement; births, marriages, and deaths; mortality tables, with the causes of deaths; physicians; abortion; quackery; vaccination; toxicology; life insurance; epidemics; sanitary regulations. Such a report must accomplish great good, and cannot fail to so elevate the importance and appreciate the value of municipal hygiene, as to render its representatives secure of professional and general respect. Those who publish such reports give honor and dignity to their profession; they give security, health, and prosperity to cities; and they save physicians the mortification of seeing medical hygiene the constant subject of mirth, contempt and ridicule in the secular papers of their cities."

[*From the New York Medical Journal, May, 1870.*]

"We have here a paper, which, though purely local in its associations, is of great interest and value. The title indicates clearly the scope of the paper, which is in fact a medical history of the locality described. Whatever tends to affect the duration of the life of peoples, such, for instance, as the influence of their occupations, their physical hygiene, mental and moral surroundings, are clearly a legitimate subject for study by the medical historian, and all communities owe it to themselves to have these studies made by accomplished medical men—for they only are competent to do this work—and to give the results to the public, that they may be thereby benefited. In this way only can the medical history of great nations be written up; and there is in store a noble work for some judicious and well-informed writer to make up, from just such contributions as this, the vital statistics and medical history of the United States. Dr. Reeves, for his own city and vicinity, has done this work most admirably, and the City Council have displayed a wise liberality in making public the results of his labors."

[*From the American Practitioner, June, 1870.*]

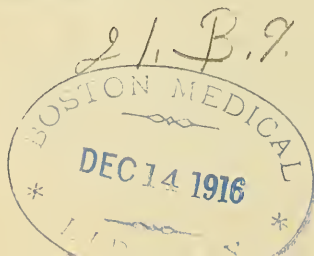
"Health officers everywhere may take example from the above pamphlet, with benefit to themselves and to the communities in which they live. Nothing so interesting as this report of Dr. Reeves's has been written concerning the City of Wheeling."

[*From the Gynecological Journal, Boston, May, 1870*]

"From West Virginia we have the "Physical and Medical Topography of Wheeling," by Dr. James E. Reeves, the Health Officer, published by order of the City Council. It is an admirable document. * * * * We commend it to the attention of our own State Board of Health."

[*From the Boston Journal of Chemistry, May, 1870.*]

"The first *Annual Report* of Dr. James E. Reeves, City Health Officer of Wheeling, West Va., is in many respects a model document. * * * * We wish that our limits permitted us to speak of it more at length."



DEDICATION.

*To his Honor, the Mayor,
and Members of the City Councils:*

GENTLEMEN :—The following pages are written in the interest of science, truth, virtue, humanity, and an exalted citizenship which is the only measure of the true wealth of communities ; and they are submitted for your patient consideration.

If, in my topographical survey, I have exposed sanitary defects and disadvantages which attach to the city—have spoken plainly of evil practices which, unfortunately, form part of the heritage of all cities and large towns—I have also made known a greater number of truths concerning the virtuous character of the people of Wheeling, as well as their general business prosperity and happiness.

To what extent I have succeeded under the new Ordinance, which your wisdom caused to be enacted so soon after your election and inauguration, in making the Health Office useful as the most economic means of preserving public health, and contributing to the happiness of all classes, your Committee on Accounts can answer. How far useful, also, in the discovery and presentation of data for the advancement of sanitary knowledge, and the general protection of human life, others, I doubt not, will hereafter faithfully decide.

Webster Street, Centre Wheeling, }
January 11th, 1870.

JAMES E. REEVES, M. D.

PREFACE TO THE SECOND EDITION.

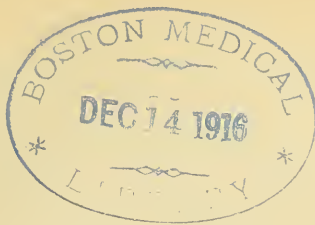
On account of the very marked favor with which the first edition of this little work was received by the Medical press, by Health Officers, and Sanitary Superintendents, as well as by Medical men generally, the author has been encouraged to the performance of the present greatly enlarged labor, which is herewith submitted in the hope that it shall prove not less worthy of professional esteem, nor less creditable to the Health Department of the city of Wheeling, than its more unpretending forerunner.

To make it more complete and useful, I have not hesitated to employ the labor of others in the field of *preventive medicine*, and in such instances have

always endeavored to acknowledge the authority. If, however, I have made any omissions in this respect, it has been done accidentally, or because I have considered whatever was thus employed common property.

In the preparation of the Biographical Record, I have been mainly assisted by my excellent friend, Dr. Robert H. Cummins, President of the Wheeling and Ohio County Medical Society, whose cultivated mind, unselfish friendships, and large heart, have won for him in the community a character in harmony with the virtuous tribute he has paid to the memory of his early and distinguished professional companions.

January 25th, 1871.



HEALTH AND WEALTH

OF THE

CITY OF WHEELING.

INTRODUCTION.

IMPORTANCE OF SANITARY SCIENCE.

"Dry and unattractive as Sanitary Studies may appear, they belong to the patriot no less than the philanthropist; they touch very nearly the future prosperity and national greatness of England. Don't fancy that the mischief done by disease spreading in the community is to be measured by the number of deaths which ensue—that is the least part of the result, as in the battle the killed bear but a small proportion to the wounded. It is not merely by the crowded hospitals, the frequent funerals, the destitution of families, or the increased pressure of the public burthens, that you may test the sufferings of a nation over which sickness has passed; the real and lasting injury lies in the deterioration of race, in the seeds of disease transmitted to future generations, in the degeneracy and decay which are never detected till the evil is irreparable, and of which, even then, the cause remains often undiscovered."—*Lord Stanley.*



ANYTHING which relates to life and the promotion of public health is of the dearest interest to the human family, and a community ignorant of properly collated facts concerning its vital history is, indeed, but feebly defended against "the pestilence that walketh in darkness, and the destruction that wasteth at noonday." To such, the wholesome lessons of domestic and civic Hygiene afford no rules and defenses for the person, the domicile, the municipality and the State, nor encouragement to its physical, social and political prosperity; and, as a consequent truth, the practical applications of science and art, commercial enterprise, manufactures, and popular

intelligence are at a low standard, while frequently recurring endemic and epidemic diseases, (so-called,) and a high death rate, constitute the most prominent features of its culpable history.

In mythological history Health was personified by the goddess Hygeia, who, according to fable touching her genealogy, was the daughter of Æsculapius, and held in such veneration by the ancients that she was not only worshiped in the same temple with her father, but her statue was often placed by the side of that of Apollo, who then derived from her a surname. So, also, on the Acropolis, at Athens, her statue stood near that of Minerva, who was hence called Minerva Hygeia.

Another legend, recorded by Plutarch, relates that while the vestibule of the Athenian citadel was being built, under the administration of Pericles, one of the most skillful workmen, missing his step, fell from the top to the bottom, and was so severely injured that his life was despaired of by the physicians. At this accident Pericles was greatly concerned; but in the midst of his affliction the goddess appeared to him in a dream and informed him of a remedy, which he applied, and thereby soon recovered the patient; and in memory of this cure he placed in the citadel, near the altar, a brazen statue of the goddess, conferring upon her the name of Hygeia, or the Minerva of Health.

But while thus worshiped in temples and in cities, she received no sacrifices of blood or oriental perfume. Her altar was strewed with flowers, and her presence was most appropriately invoked on the mountain side or in the shady dell of the wild wood, along the banks of the limpid, rippling stream, whose music, accompanied with the notes of the shepherd's pipe and borne upon the balmy breezes of her fairy realm, made merry the festive dance of her rustic maidens. It was supposed that she presided over and took especial pleasure in the feats and sports of the gymnasium—wrestling, boxing, racing, foot-ball, pitching the quoit, throwing the javelin, and every other manly exercise by which the Greek and Roman youth were trained to the endurance of fatigue, and acquired that strength of body and contempt of danger that made them the terror of their enemies.

Connected with the *palastræ*, or those places where they exercised themselves in gymnastics, as well as in philosophical disputations and discussions on various literary subjects, were the public *baths*, distinct for both sexes, in adorning which incrustations,

metals and marble were all employed, and painting and sculpture exhausted their refinements. To these magnificent apartments all classes of people were attracted, both for purposes of health, and to prepare the body for the exercise of the public games. In a word, great cleanliness of person was enjoined in all the systems of ancient training for health and vigorous development of the body, not less than a proper supply of nutritious food and regular exercise.

The Ancient Fathers of Medicine were earnest cultivators and teachers of Hygiene, and being the chosen counselors of those in authority, they were the authors of the immense sanitary designs, successes, and handy-works, which made Rome the mistress of the world, and the Cæsars her popular guardians. To this day may be seen in the region round about the Eternal City, the mouldering remnants of the vast subterranean galleries, aqueducts, and sewers, which, while they perpetuate the wisdom and grandeur of the age in which they were constructed, tell the downfall of a mighty empire. Centuries ago, the country surrounding Rome could boast of its hundred flourishing cities; but now it is a sickly waste, inhabited by a scattered peasantry whose degeneracy, physical, mental and moral, is plainly registered upon their countenances, and marks the pressure of public suffering, consequent upon their lapse to superstition and slavery. Greece, with the loss of her liberty and the ruin of her cities, has an altered climate, dating back perhaps from the days of the Peloponesian war—more than 400 years before the Christian era—when polished and populous Athens was devastated by fire and sword, and *plague* followed in the train to complete the horrors of her lamentable desolation. This pestilence destroyed the youth and strength of Athens, and is described by Plutarch as having affected, not only their bodies, but their very minds also. As they set themselves against a physician, or a father, so they raved against Pericles, and attempted his ruin, being persuaded that the sickness was occasioned by the multitude of out-dwellers flocking into the city, and a number of people stuffed together, in the height of summer, in small huts and close cabins, where they were forced to live a lazy, inactive life, instead of breathing the pure and open air to which they had been accustomed. They would needs have it, that he was the cause of all this, who, when the war began, admitted within the walls of the city such crowds of people from the country, and yet found no

employment for them, but let them continue penned up like cattle, to infect and destroy each other, without affording them the least relief or refreshment.

Desirous to remedy this calamity, and thus regain public confidence, Pericles embarked in an extensive expedition, and laid siege to the sacred city of Epidaurus, which was consecrated to Æsculapius, but the distemper which prevailed in his army broke all his measures, for it not only carried off his own men, but all that had intercourse with them.

In Great Britain, France, Germany, Austria and Prussia, sanitary knowledge and sanitary improvements have markedly increased the average duration of human life, notwithstanding the many unfavorable hygienic conditions and influences that result from a dense and constantly increasing population. In London, especially has the increase of probability of life been plainly seen. About the middle of the sixteenth century the population was estimated at a half million, and the average duration of life was only twenty-five years—fifty dying annually out of every one thousand of the inhabitants. The streets were narrow, ill-paved, and equalled the imperfectly constructed sewers as receptacles of all manner of abominable filth; the dwellings, principally of wood, were overcrowded, and no attention whatever paid to their ventilation; water was scantily supplied; personal and domiciliary cleanliness neither encouraged nor enforced; and the city was given up to licentiousness. Then—in 1665—London was visited by plague, and it has been estimated that in one night 3,000 persons perished from the ravages of the terrible devastator, and that up to 1679, from that source alone the mortality amounted to 100,000! But now, with its stupendous sewers, which have recently been completed at a cost of \$20,000,000, and its population increased to millions, how different the result! Instead of *twenty* years, the average duration of life is *thirty-seven* years, and the rate of mortality, instead of *fifty*, is *twenty-five* in one thousand of the population.

In Holland, dreary swamps have been converted into green and fertile fields, and numerous flourishing cities built upon spots where the foot of man could not once have trodden with safety. Calcutta, built on a swamp, on the east side of the Hoogly, and, at a few miles distance, surrounded by lakes, which are supplied from overflows of the river, by a proper system of draining of that

part of the city inhabited by Europeans, has become as healthy as any country of the same latitude on earth ; while, on the contrary, Stockholm, built on small islands at the entrance of Lake Malar, with a mean annual temperature of 40° , and possessing the requisite natural advantages, if properly improved, to make it the healthiest city in Europe, is, because of gross sanitary defects—imperfect drainage and a bad supply of water to houses—the *unhealthiest* in that quarter of the globe, as shown by its death rate.

Hygiene ever goes hand in hand with true liberty, and is the companion of orderly habits and pure morals. During the fourteenth century, when vice and misrule in Europe had their greatest sway, and the beautiful fruits of civilization were trampled under foot by barbarian warriors—when acquisitions that had cost mankind ages of toil and labor, were lost in the general wreck—when the night of ignorance was darkest, and human degradation driven to its lowest depths—then hygiene was neglected and *plagues* numerous and almost universal rested upon the people. Hence, it has been truly said that general health is inconsistent with national servitude.

Health cannot be estimated too highly. Indeed it is so necessary to all the duties, as well as pleasures of life, that “the crime of squandering it is equal to the folly ;” and in a country like ours, where legislation fluctuates with the wants and wishes of the people, it is very evident that a knowledge of rational precepts—the laws of Hygiene—for the preservation of health and prevention of disease, must be indispensable guides to the enactment of good laws, whether as relating to individual welfare, or the flourishing condition of the body politic. To the honor of our adorable profession be it said, that from the date of the earliest Egyptian records, when priests—who were the depositaries of all knowledge—employed magical incantations for the cure of the sick, to the present, when no calling represents more fully or honorably than the science of medicine, the intellectual tendency of the times and a fairer average measure of the advancement which is occurring all round us, every discovery that has been made concerning life, and of protecting communities or individuals from prevailing diseases, is to be accredited to medical science and medical heroism, whose levies of precious knowledge, gathered from earth, sea and sky, have blest mankind in every age of the world.

From the remotest antiquity, *preventive* rather than *curative*

medicine has been sought after by the wise of every age and nation, and among the injunctions which have descended to us along the line of many centuries, and not less important to-day than when they were first uttered by Hippocrates, who lived 460 B. C., are the following: "Observe the difference of airs, and of waters which are drunk. The eatables which are the principal food of the inhabitants, and in one word, all the causes which may occasion disorders in the animal economy." Again—"It is the business of the physician to know, in the first place, things similar and things dissimilar, which are to be perceived by the sight, and the touch, and the hearing, and the nose, and the tongue, and the understanding;" and again—"It is not in the dust of the schools, nor the works of the philosopher, that we can learn the art of interrogating Nature."

Celsus, the Roman Hippocrates, inculcated the same important precepts, and thus echoed the great master. Galen was not less comprehensive and perspicuous in his instructions for preserving health; and from his age down to the times of our own Rush, Cartwright, Drake and Fenner—the pioneer Medical Topographers in the New World—all the recognized lights in the history of the Healing Art, have taught *how* and *why* the physician should first study Nature's processes and indications in health and disease. In truth, the ancients were not only men of vast genius, but of the greatest diligence and unwearied application. They kept their eyes steadily fixed on what they would describe, and gave the most perfect models, and most just copies. In this Hippocrates so greatly excelled, that he had the united applause of the nations around him, and many of his observations have been found perfectly just through all succeeding ages. It is, therefore, not in Poetry only, but in Physic also that Horace's advice is good:

Vos exemplaria Græca
Nocturna versate manu, versate diurna.

Accordingly, Sydenham, Harvey, Boerhaave, Haller, Pringle, Huxham, Blane, Jenner, Laennec and their companion worshipers and ministers in the "true church in medicine," built upon the foundations their predecessors had laid; and so, in the third quarter of the nineteenth century, are the faithful students and interpreters of Nature in America, armed with the priceless implements of their toils, industriously prosecuting the work committed to their hearts and hands.

With all enlightened physicians of the present day confidence in the operation of natural laws is constantly gaining ground, simplifying and giving success to medical practice; they recognize the subordination of pharmaceutic agents and formula to hygienic influences—

“ALIMENTATION, including food, drink, so-called accessory food, and the employment of those mineral waters, or other substances, which supply elements deficient in the organism; AIR—including ventilation, hygrometric condition, density or rarefaction, artificial increase of the percentage of oxygen, etc.; TEMPERATURE—including climate, clothing, heating rooms, etc.; EXERCISE—including its antithesis, rest, passive exercise, friction, etc.; BATHING—general and local; ELECTRICAL influences; SUNLIGHT, etc., in the treatment of diseases, and they thus regard Nature as the great active verb, and drugs as, at best, auxiliaries necessary to qualify expression in certain moods and tenses, but only aiding, not giving, the full meaning.”*

Urged by the progressive minds of the medical profession in most of the American cities and large towns, and standing face to face with terribly significant and suggestive facts concerning the comparative duration of life in different communities—the causes of deaths, and all the influences of race, inheritance, climate, soil, occupation, diet and drinks, putridity and contagion, virtue and vice—the municipal representatives of the people are beginning to learn something respecting the economic and political importance of public health and salubrity; and it is sincerely to be hoped that the day is not far distant when the march of sanitary improvement, or the study of *preventive medicine*, shall have commenced in earnest all over the land. Its objects rank among the most important matters now discussed by the highest intellects and humanest hearts in every civilized country; and no jurist questions the right and duty of governments to make and enforce laws for the protection of the public health, for preventing and exterminating pestilential diseases, and to secure to all peoples and classes not only as long a life as nature would give, but likewise as healthy a life as possible. In this wide field of humanity, and to this end, assistance is everywhere needed—from the chemist, the naturalist, the engineer, and from the humblest citizen as well as from the statesman. Then, when sanitary science is uniformly cultivated by physicians; is taught in common schools as well as in academies and higher

* Hygiene in its Relations to Therapeusis—By Dr. Alfred L. Carroll.

seminaries of learning; appreciated by the people as a matter of very great concern to every citizen; and encouraged and enforced by the municipality and the State—*sanitary measures* may prove omnipotent against epidemics, and save annually the lives of thousands of laborers and mechanics to whom a healthful and vigorous frame is the greatest wealth.


There is no class in society to which a knowledge of the laws of health is of greater importance than it is to that of the working men in our manufacturing districts. Every day of sickness, whether produced from any one of the thousand circumstances intimately connected with their several trades or professions, insalubrity of the workshop, the city or town, or by accident—is, indeed, so much cash capital deducted from the fund upon which they and their families can alone depend for support; yet it is frequently the case that they overlook every principle of hygiene, and therefore regularly pay the penalty imposed by the Moloch of preventable disease.

Surely “public health is public wealth;” but “experience proves the health of a city, like the sacred fire on the altar, requires the constant vigilance of its guardians.”



GEOGRAPHICAL POSITION--BRIEF HISTORY, ETC.

The wise physician, pictured by Hippocrates, is "he who has a due regard for the seasons of the year and the changes which they are observed to produce, to the state of the wind peculiar to each country, and to the quality of its waters; who marks carefully the locality of towns and of the surrounding country, whether they are low or high, hot or cold, wet or dry."

HEELING, the principal city in West Virginia and seat of government of Ohio county, with a population of 23,000,* is situated in latitude $40^{\circ} 7'$ north, by longitude $80^{\circ} 42'$ west, on the east bank of the Ohio river, at an average altitude of 650 feet above the level of the sea, and from 40 to 90 feet above low water mark in the river. It is distant from Pittsburgh 91 miles, Parkersburg 94 miles, Columbus 137 miles, Cleveland 148 miles, Chicago 480 miles, Baltimore 379 miles, and bounded on the east by a range of steep hills, having a mean altitude of 400 feet above the level of the bed of the Ohio.

THE FIRST SETTLEMENT was made in 1769, by the brothers, Colonel Ebenezer, Silas and Jonathan Zane, within the protection of Fort Fincastle, which, in honor of Patrick Henry, was subsequently named Fort Henry. These hardy, heroic men laid claim to the bottom and table lands now occupied by the city and suburbs, and by them the original town was laid out in 1787. The first settlers came from the region of the south branch of the Potomac, and were of Scotch and English descent.

THE ENVIRONS—Clinton, Fulton, and Manchester, adjoining, and Martinsville, Bridgeport and West Wheeling, on the opposite (or Ohio) side of the river, would give to Wheeling and suburbs about 28,000 souls, and an aggregate wealth, at a just valuation of taxable property, of not less than \$15,500,000, or a distributive wealth of \$574 to every man, woman and child in the commu-

*This number includes Richietown or South Wheeling.

nity. The population of the city embraces about two-thirds of the inhabitants of the county, and pays into the county and State treasury seven-tenths of all the taxes assessed. Including the city, the population of the county is equal to 300 inhabitants to the square mile.

THE RAILWAY FACILITIES of Wheeling are extensive and important. The great Baltimore and Ohio Railway affords mutual coöperative relations with Baltimore and the Atlantic seaboard; the Central Ohio Division, under the same efficient management and control, gives direct communication with the great States of Ohio, Indiana and Illinois, as well as with the entire Western and Northwestern country, and connecting with the lakes at Sandusky; the Cleveland and Pittsburgh Railway gives an important connection with the lakes at Cleveland and also with Pittsburgh, and from thence to Philadelphia; the Hempfield Railway gives communication with the interior of Pennsylvania, and when this line shall have been completed to Pittsburgh—a work soon to be accomplished—it will become of first-rate importance to Wheeling.

The extensive railway communication with all parts of the country, East and West, North and South, together with the immense natural advantages for the transportation of passengers and freight afforded by the great river on the banks of which the city is built, all combine to bestow on Wheeling advantages seldom possessed by any inland city, and hence the thriving business prosperity of its manufactures.

MANUFACTURING ADVANTAGES.—As a manufacturing point, Wheeling possesses advantages scarcely equalled by any city west of the Alleghany Mountains.

The immense deposits of bituminous coal in the adjacent hills, and in the entire country for many miles round about the city—the ease with which it is mined and conveyed by *tram railroads* from the banks for mines to the furnaces—the abundance and moderate price of the necessities of life—and the accustomed great good health of the people, are some of the advantages which give encouragement and facilities for manufacturing more abundant and less expensive, perhaps, than are possessed by its rivals; and indicate to what extent capital directed by intelligence and energy may be profitably invested, as well as the future growth, business prosperity and importance of the city.

Steam is the great motive power, and, when so cheaply obtained as in Wheeling, is far more economical than water power. Indeed, the steam engine is the power in every manufacturing establishment of any extent in the city, and is considered as necessary as capital to business.

The Nail Mills of Wheeling—the Riverside Iron Works, Belmont, La Belle, and Wheeling Iron and Nail Works, including the two mills at Benwood and Bellaire, which are four miles distant from Wheeling—cut 17,350 kegs of nails per week, or about 902,200 kegs annually, at an average value of \$4,059,900. Besides these and other rolling mills for the manufacture of railroad bar, rod, hammer iron, sheet iron, bridge iron, bolts, etc., there are two spike mills which turn out annually, for railroad and boat-building purposes, from 50,000 to 60,000 kegs.

Fifty miles of the rails of the great Pacific road were made at one of these mills.

Next in importance is the Glass Manufacture. In this department there are six extensive establishments—one of which, it is claimed, is the largest of the kind in the United States.

ENCOURAGEMENT TO IMMIGRANTS.

THE NATURAL RESOURCES OF WEST VIRGINIA are positively of the most inviting character, and all that is now lacking to develop inexhaustible wealth and put the State in the line of progress—to surround it with the enduring muniments of wealth and numbers—is immigration, which, from a variety of causes, has been greatly embarrassed, if not entirely discouraged, during the past several years. The future, however, is far more promising than the past has been prosperous. What immigration has done for the North, Northwest and West, it is sincerely to be hoped shall be done for West Virginia. There is much room to be occupied.

The State has an area of 26,000 square miles, and, according to the recent census, a population of about 450,000, giving seventeen persons to each square mile, or a farm of about thirty-seven acres of land to every man, woman and child in the State.

The climate is mild, water-power immense, and generally distributed; the hills and mountains are full of coal and other valuable minerals; there are scores of oil wells, yielding daily thousands of gallons of petroleum, of various qualities, as well as numerous profitable salt wells in the Kanawha region. The fields yield

abundant harvests of wheat, indian corn, rye, barley, oats, buck-wheat, potatoes, tobacco, flax, hemp, sorghum, broom corn, clover, and other luxuriant grasses, native and introduced; all kinds of garden products, used as food, are successfully cultivated; the orchards yield the choicest fruits—apples, pears, quinces, peaches, plums, nectarines, apricots, cherries, and to which may be added melons, grapes,* and countless varieties of berries, either native or foreign, all of which find here a genial home.

The forests are thickly studded with the best of timbers for ship-building and house-building purposes—white, black and red oak, hickory, ash, hemlock, cedar, maple, sugar, walnut, (white and black,) locust, poplar, (yellow, white and tulip,) beech, birch, sycamore, cherry, chestnut, gum, etc., as well as for furniture, staves, hoops, etc.; and afford a thousand useful substances, the value of which will be developed by closer attention.

THE MEDICAL BOTANY of the State—indigenous and introduced—owing to diversity of surface, soil and climate, is singularly rich, and embraces almost every plant found growing in any part of the United States. The following list, arranged alphabetically, gives the names of the growths found in the forests, fields and gardens:

A	B
Ash, Prickly— <i>Xanthoxylum</i> .	Burdock— <i>Lappa</i> .
Alum Root— <i>Heuchera</i> .	Button Snakeroot— <i>Eryngium</i> ; <i>L. Scariosa</i> and <i>L. Squarrosa</i> .
American Hellebore— <i>Veratrum Viride</i> .	Black Snakeroot— <i>Cimicifuga</i> .
American Centaury— <i>Sabbatia</i> .	Bitter Sweet— <i>Dulcamara</i> .
American Senna— <i>Cassia Marylandica</i> .	Blackberry— <i>Rubus Villosus</i> .
Alder, Black— <i>Prinos</i> .	Broom— <i>Scoparius</i> .
Anise— <i>Anisum</i> .	Boneset— <i>Eupatorium Perfoliatum</i> .
Aspen— <i>P. Tremuloides</i> .	
B	C
Balm— <i>Melissa</i> .	Cranesbill— <i>Geranium Maculatum</i> .
Balm of Gilead.	Coriander.
Buck Eye— <i>Æsculus Glabra</i> .	Catnep.
Beech Drops— <i>Orobanche Virginiana</i> .	Caraway.
Birch— <i>Betula Lenta</i> .	Calamus, or Sweet Flag— <i>C. Acorus</i> .
Blood Root— <i>Sanguinary Canadensis</i> .	Carrot— <i>Daucus Carota</i> .
Bugle Weed— <i>Lycopus</i> .	Comfrey— <i>Symphytum</i> .
Blue Flag— <i>Iris Versicolor</i> .	Catawba tree— <i>Catalpa Cordifolia</i> .
	Crowfoot— <i>Ranunculus</i> .

*The varieties most successfully cultivated are the Isabella, Concord, Catawba (principally cultivated for the manufacture of wine) and Delaware, which, because of the perfection of their growth and peculiar richness of flavor, have found ready sale in the markets of Baltimore, Philadelphia, New York and Boston. Some idea may be had of the extent of the grape culture in the vicinity of Wheeling, within a radius of five miles, when the fact is stated that of this delicious fruit not less than 31,350 bushels, or 1,500,000 lbs. were vintaged last year; and from equally reliable data it has been ascertained that about 90,000 gallons of wine were manufactured; and yet this enterprise among the hills of West Virginia and Eastern Ohio has but just begun.

D

Dewberry—*Rubus Trivialis*.
 Dandelion—*Taraxacum*.
 Dogwood—*C. Florida* and *C. Sericea*.
 Dragon-root—*Arum Triphyllum*.
 Dock, narrow and curled leaf—*Rumex Acutus* and *Crispus*.

E

Elm, Slippery—*Ulmus Fulva*.
 Elder—*Sambucus*.
 Elecampane—*Inula*.

F

Foxglove—*Digitalis*.
 Flaxseed—*Linum*.

G

Garlic—*Allium*.
 Ginseng—*Panax*.
 Ground Ivy—*Glechoma Hederacea*.
 Gum, sour, sweet—*Styraciflua*.
 Grapevine—*Vitis*.
 Green Brier—*Rotundifolia*.
 Golden Rod—*Solidago*.

H

Haw—*Crataegus*.
 Huckleberry—*Vaccinium Resinosum*.
 Horse Mint—*Monarda*.
 Horehound—*Marrubium*.
 Hops—*Humulus*.
 Horse Radish—*Armoracia*.
 Hazlenut—*Coryllus Avellana*.
 Holly—*Ilex Opaca*.

I

Indian Turnip.
 Indian Tobacco—*Lobelia Inflata*.
 Indian Physic—*Gillenia*.

J

Jamestown Weed—*Datura Stramonium*.
 Jerusalem Oak—*Chenopodium*.

L

Liverwort—*Hepatica*.
 Laurel—*Kalmia Latifolia*.
 Lettuce—*Lactuca*.
 Larkspur—*Delphinium*.
 Ladies' Slipper—*Cypripedium Parviflorum*.
 Life Everlasting—*Gnaphalium Margeritaceum*.
 Lilac—*Syringa Vulgaris*.

M

May Apple, Mandrake—*Podophyllum*.
 Mulberry—*Mora*.
 Masterwort—*Heracleum*.
 Mayweed—*Anthemis Cotula*.
 Mustard—*Sinapis Alba* and *Nigra*.
 Mullein—*Verbascum*.

N

Nettle—*Urtica*.

P

Pawpaw—*Porcelia Triloba*.
 Pennyroyal—*Hedeoma*.
 Poke Root—*Phytolaccae*.
 Parsley—*Petroselinum*.
 Peppermint—*Mentha Piperita*.
 Poison Oak—*Toxicodendron*.
 Persimmon—*Diospyros*.
 Pipsissewa—*Chimaphila*.
 Pink Root—*Spigelia*.
 Pepper—*Piper Longum*.
 Plantain—*Plantago Major*.
 Pleurisy Root—*Aselepias Tuberosa*.

R

Red Bud—*Cerces Canadensis*.
 Raspberry.
 Red Root—*Ceanothus Americanus*.
 Rue.
 Roses, every variety—*Rosmarinus*.
 Rhubarb—*Rheum*.

S

Service Tree—*Pyrus*.
 Sumach—*Rhus Glabrum*.
 Seneka Snakeroot—*Senega*.
 Sassafras.
 Sarsaparilla, several varieties.
 Spearmint—*Mentha Viridis*.
 Skunk Cabbage—*Ictodes Foetidus*.
 Saffron—*Crocus*.
 Spicewood—*Benzoin Odoriferum*.
 Smartweed—*P. Hydropiper*.
 Strawberry—*Fragaria*.
 Sweet William—*Dian. Barb.*
 Silk Weed—*Aselepias Syriaca*.
 Sorrel tree—*Andromeda Arborea*.
 Sage—*Salvia*.*

T

Thistle—*Genus Carduus*.
 Tansy—*Tanacetum*.
 Thyme—*Thymus Vulgaris*.

V

Virginia Snakeroot—*Serpentaria*.
 Violet—*Viola*.

W

Wormwood—*Artemisia Absinthium*.
 Wild Ginger—*Asarum*.
 Wild Cucumber—*Elaterium*.
 Wild Cherry—*Prunus Virginianus*.
 Witch Hazel—*Hamamelis Virginica*.
 Wahoo—*Euonymus Atropurpureus*.
 Willow—*Salix*.

Y

Yellow Root—*Xanthorrhiza Apiifolia*.
 Yellow Puccoon—*Hydrastis Canadensis*.

*The sage was highly esteemed by the ancients, and celebrated at the school of Salerno.

"Cur moriatur homo, cui salvia crescit in horto?"

Contra vim mortis, non esse medicamen in hortis?"

Salvia salvatrix, Naturæ consiliatrix,

Salvia cum ruta faciunt tibi pocula tuta!"

Besides the Botanical growths named in the foregoing catalogue there may be added the Arbor Vitæ and other ornamental ever-greens and shrubbery, native and introduced.

Such are some of the bounties which Providence has vouchsafed to the people of West Virginia. Shall they not profit by them? And are there not here CHEAP HOMES FOR THE MILLION? By all means immigration should be encouraged. No sparsely peopled country, whatever its natural advantages, ever exhibited a really diversified industry. See the New England States—in spite of natural poverty, a cold, bleak and unproductive soil, density of population and manufactures—have given the greatest diversity of industries and the most substantial wealth, benefitting alike the merchant, the mechanic, the husbandman, the banker, the professional man—indeed, every citizen of the country. Take, for example, the town of Lowell, a city depending almost exclusively upon its manufacturing interests. With every drawback, and no advantages except its water power and the indomitable energies of its inhabitants, it has grown, within a few years, from a mere hamlet, with one manufacturing company (the Merrimack), organized in 1822, into an active, thriving city, with *fifty mills*, turning 450,000 spindles, running over 12,000 looms, giving employment to 14,000 operatives, and supporting seven national and four savings banks, with an aggregate capital and deposits amounting to many millions of dollars.*

The well nigh sealed book of West Virginia's great resources should be opened, and its treasures and inducements made known in every available manner to immigrants, in order that foreign capital, energy and numbers shall be attracted hither.

The advantages to the immigrant of a home in West Virginia are, indeed, far above those presented in many portions of the States farther west. There, wells must be dug to obtain water; wood and coal are scarce, and a malarious climate soon saps the strength of his physical powers, and he is more likely to be prostrated by serious sickness which he is so illy prepared to meet. Here, nature has opened up a never-failing fountain of pure water on every farm; there is no scarcity of fuel, and good health is the rule at all seasons.

There is no interest that can compare, either in importance or extent, with the general and individual interest which every man has in the preservation of health and life. One man's estate may be in land, the property of another in funds, of a third in a cotton

*Proceedings of the Immigration Convention, Charleston, S. C., May, 1870.

mill, of a fourth on the wide ocean, of others in their labors, manual or intellectual; but, each and all of these modes of obtaining individual subsistence, and contributing to the social welfare of the whole, are, and must be, subordinate, both individually and generally, to the possession of health. He whose property is vested in his own labor, who depends for his daily support on the work of his hands, or the workings of his brain, if health fail, must either starve or become dependent on public or private support; he whose estate has been acquired for him by the labor, manual or intellectual, of others, is still dependent for subsistence on the health of those who make it productive, and yet further, for the enjoyment of it, on the same invaluable possession in his own person. It needs no labored argument, then, to show the importance of the probability of health in the selection of homes for immigrants.

Dr. Engle, of Berlin, a prominent German Statistician, and Director of the Prussian Statistical Bureau, in his most painstaking treatise on the price of labor, distinguishes in the economic life of each man, one productive, and two unproductive periods. The raising and education of the individual until he reaches his fifteenth year, comprises the first period, which is not only unproductive, but necessarily requires considerable outlay. The second period extends from the fifteenth year to the sixty-fifth year, which comprises the productive part of life. The third, or after sixty-five years, comprises the unproductive years of old age.

"It is only during the second or productive period," says Mr. Friedrich Kapp, "that man is able to subsist on the results of his own labor. In the juvenile period he is dependent on the assistance of others, and in the aged period he has to live upon the accumulated fruits of the productive years. Whether or not the child in its first period lives at the expense of his parents, there must be means for its maintenance and education, and as nature does not spontaneously furnish those means, and as they cannot be provided by others without danger of impoverishment if not replaced, they must be obtained by labor. This labor is performed during the productive period, in which the following three objects should be attained, viz.: 1—The payment of the expenses incurred for the support and education of the child in the juvenile period. 2—The satisfaction of the daily wants and the maintenance of the productive power of the individual. 3—The laying up of a surplus fund for his sustenance during the aged period. Thus the cost of bringing up and education of a man constitutes a specific value, which benefits that country which the adult individual makes the field of his physical and intellectual exertions. This value is represented by an outlay which is necessary to produce an ordinary laborer. An immigrant, therefore, is worth just as much to this country as it costs to produce a native-born laborer of the same average ability.

"It is evident that the capital value which a grown-up, able-bodied

immigrant represents is different according to his station in life and the civilization of the country from whence he comes. The wants of a skilled and unskilled laborer from the same country differ widely. Those of the Englishman are different from the Irishman. The German must be measured by another standard than the Mexican or South American. Their mode of life, their economical habits and practical pursuits, have little in common; and, hence, the benefit to the country of their adoption varies according to their respective previous relations. It is certain, however, that each immigrant brings, independently of his personal property, a certain increase of wealth to the country, which increase is paid by the country from which he comes, and accordingly must be credited to it.

"In order to arrive at the most accurate possible estimate of this addition of wealth, it is necessary to inquire into the cost of raising and educating in this country a man whose means of living are wholly derived from his physical labor. I shall not include in the following calculation the professional man, the scholar, the lawyer, the clergyman, the physician, the engineer, and others, who, in the course of years, have likewise come here by thousands, and added to our productive wealth in proportion to the greater cost of their education; but I shall confine myself to the class named, which forms the great majority of immigrants:

"Dr. Engle computes the cost of raising a manual laborer in Germany at 40 thalers a year for the first five years of his life; at 50 thalers for the next five years; and at 60 thalers from the eleventh to the fifteenth year, thus arriving at an average of 50 thalers per year, or 750 thalers in all. From my knowledge of German life, I consider this estimate as correct as it can be made; and, assuming that in this country subsistence costs about twice as much as in Germany, I do not think I shall be far from the truth in doubling Dr. Engel's estimates, and in assuming the expense of bringing up an American farmer or unskilled laborer for the first fifteen years of his life to average 100 thalers per year, or a total of 1,500 thalers, equal to \$1,500 currency. Following Dr. Engel's estimate, an American girl will be found to cost only about half of that, or \$750, for the reason that she becomes useful to the household from an earlier age. Allowance must be made, it is true, for the fact that about one-fifth of the immigrants are less than fifteen years old; but this is fully balanced by the great preponderance of men over women, and by the thousands who represent the highest order of skilled labor. Hence, I feel safe in assuming the capital value of each male and female immigrant to be \$1,500 and \$750, respectively, for each person of either sex, making an average for both of \$1,125."*

Mr. Charles Reemelin, one of the most prominent American political economists, in a very able address before the German

* Journal of Social Science, of the American Association, No. 2, p. 14. 1870.

Pioneer Association of Cincinnati, May 26, 1869, estimated the value of each immigrant who had come to that city to live at \$1,500, and the total value of the 50,000 immigrants who have taken up their residence there in the last forty years at SEVENTY-FIVE MILLIONS OF DOLLARS.

During the past five or six years much has been written by the press, and the people and the Legislature have talked, in favor of immigration, but thus far, nothing substantial has been accomplished. The *prize*, however, is none the less important; while the necessity is all the greater, because of previous failure, for united and great efforts to win it. If won, it will bring labor, wealth and power; and therefore it should receive the largest patronage from the Legislature.

The question is—What is the economic value of each immigrant to the country of his adoption? Can the people of West Virginia afford to stand idly by while foreign capital and thousands of able-bodied men are occupying, developing, and enriching other and poorer fields, and not so much as throw out their hands to invite the current within their rich borders. Material development is the source of wealth, and wealth brings in its train prosperity, and all the concomitants of a solid civilization.



GEOLOGICAL STRATIFICATION.



HIS subject is of very great importance in an economical as well as hygienic point of view, and so extensive in its relations that to discuss it minutely would require far more space than is contained in all these pages.

Soils derive their characteristics from the geological constitution of the surface upon which they rest, and their modifications in different localities, their accumulations in certain situations, and the ceaseless chemical changes which they undergo in their endless relations with temperature, moisture, etc., play an important *role* upon human health and human happiness.

“Man,” says M. Boudin, “is in more respects than one the mere expression of the soil on which he lives;” and a not less confident and extensive estimate of the moulding force of telluric and atmospheric conditions and influences, in giving individual and national character, is advocated by Mr. Buckle, and made the subject of one of his most attractive chapters.

There is nothing very singular in the geological formation of the region round about Wheeling. The dip of all the strata is 12.07 feet per mile; and taking the highest point of the hill range—Chapline’s Hill—the stratification, ascending from the bed of Wheeling creek, is according to the following order:

1. Bed of creek: limestone, said to contain fossils, ferruginous clay, blue clay; depth of strata not positively ascertained.
2. Sandstone, containing pyrites, extensively quarried for building purposes. The Custom House and Postoffice and several of the largest and most costly church edifices are built of it; 25 feet working stone, the remainder loose and of no practical value; entire depth, 100 feet.
3. Limestone boulders, blue clay, yellow clay, nodular sandstone; inclusive, 25 feet.
4. Coal measure, rich in bitumen, with strata of basic, central, and roofing slates composed of sulphuret of iron; 5 feet.
5. Compact yellowish or reddish steatite or soapstone, blue clay, various qualities of limestone, from which the lime market of the

city is supplied; some of it semi-hydraulic; depth, inclusive, 25 feet.

6. Bituminous shale, disposed in thin layers; sandstone, with deposits of oxide of iron; soft limestone, fire clay; inclusive, 10 feet.

7. Bluish or mottled clay slate, soft and without imbedded minerals; sand or flagging stone, with deposit of oxide of iron; inclusive, 28 feet.

8. Limestone, very different in color and quality; yellow clay, yellow steatite, fire clay; inclusive, 70 feet.

9. Sandstone of different qualities, some of it very hard and fine grained; limestone, equally different as to quality and color; yellow clay, bituminous shale; inclusive, 48 feet.

10. Brown limestone and gray sandstone, stratified; 35 feet.

11. Cannel coal; 18 inches.*

12. Sandstone, different varieties, stratified: limestone, hydraulic; sandstone, micaceous with carbonate of iron; inclusive, 55 feet.

13. The remainder to subsoil, irregular and non-formative superstrata; 180 feet.

14. Subsoil, tough yellow clay, 14 feet, and which formerly gave root to several varieties of the oak, the birch, hickory, poplar, dogwood, locust, walnut, etc.

* Several years since, before the discovery of petroleum, Dr. R. W. Hazlett, of South Wheeling, made a distillation of this coal, which yielded 20 per cent. bitumen and 80 per cent. argillaceous schist. To this gentleman I am much indebted for valuable assistance in making the section of strata herewith recorded, which in the main corresponds with observations recently made by Dr. Hildreth.



CLIMATE.



F all the diversified and complex relations which man bears to surrounding influences, there are, perhaps, none so important as those which relate to the locality and climate in which fortune may happen to place him. Considered either in his political, physical, social, moral, industrial, but, above all, his sanitary position in regard to these influences, the subject is of transcendent importance, for it involves the main questions of success in life. If he take up his abode in an uncongenial climate, the inevitable sequence will be a correspondingly unfavorable influence upon his destiny—a check upon his prosperity, and a blight, more or less serious, upon all those attributes which are usually considered essential to his well-being and happiness.

According to meteorological observations, covering a period of fifteen years, made by a member of the City Faculty—Dr. E. A. Hildreth—the average mean annual temperature of Wheeling is $^{\circ}51.64$ Fahr., or a monthly mean fluctuation running through the same number of years, as follows :

January... $^{\circ}28.97$	April... $^{\circ}49.75$	July..... $^{\circ}73.91$	October... $^{\circ}50.95$
February.. $^{\circ}33.05$	May... $^{\circ}60.06$	August.... $^{\circ}73.74$	November.. $^{\circ}41.96$
March.... $^{\circ}38.43$	June... $^{\circ}69.77$	September.. $^{\circ}65.56$	December.. $^{\circ}34.01$

For the same period, the average mean temperature for the seasons is for—

Spring, $^{\circ}49.38$	Summer, $^{\circ}69.37$	Autumn, $^{\circ}52.82$	Winter, $^{\circ}32.01$
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The highest and lowest average monthly mean temperature is presented thus :

	Maximum.	Minimum.		Maximum.	Minimum.
January	$^{\circ}51$	$^{\circ}2.66$	July	$^{\circ}94$	$^{\circ}56$
February	$^{\circ}57$	$^{\circ}5.2$	August.....	$^{\circ}91$	$^{\circ}53$
March.....	$^{\circ}63$	$^{\circ}12.4$	September.....	$^{\circ}85$	$^{\circ}43$
April.....	$^{\circ}75$	$^{\circ}28.$	October.....	$^{\circ}75$	$^{\circ}34$
May.....	$^{\circ}82$	$^{\circ}38.8$	November.....	$^{\circ}64$	$^{\circ}22$
June.....	$^{\circ}91$	$^{\circ}49.3$	December.....	$^{\circ}59$	$^{\circ}11.6$

Highest temperature 102°. Lowest 15°. Variation between extremes 117°.

There is a marked difference in city and country when the temperature of Wheeling is compared with that of Cameron, a point 28 miles south on the line of the Baltimore and Ohio Railroad, depending partly on difference in altitude. Peach trees bloom and vegetation puts forth much earlier here than there: and while our changes of temperature are more sudden and marked, and violent storms more frequent, upon the whole, we have more fair days, no doubt, than would be found south of us twenty-five or thirty miles.

The average dew point for each month, in 1869, and relative proportion of hygrometric moisture, have been carefully recorded by Dr. Hildreth, and are as follows:

	Dew Point.	Humidity.		Dew Point.	Humidity.
January	°38.35	°8.87	July.....	°58.88	°5.48
February.....	°44.3	°8.63	August	°57.16	°5.21
March.....	°36.78	°8.74	September.....	°53.21	°5.56
April	°43.96	°8.04	October.....	°41.17	°6.28
May.....	°56.11	°7.52	November.....	°34.79	°7.99
June.....	°60.32	°7.16	December.....	°36.25	°8.77

From the above table it is seen that the lowest dew-point and highest hygrometric moisture happen in winter, and during summer exactly the reverse of these conditions occurs.

Frosts do not usually occur later than May, nor earlier than the first or middle of October, but in the mountain regions of the State they come every month in the year.

The amount of atmospheric precipitation is shown, according to the annual average for 20 years, to be of rainy and snowy days, 117.77; of cloudy days, 77.15; of clear or fair days, 172.3; average annual perpendicular depth of rain and melted snow, 31.17 inches.

The direction of the winds is almost constantly from the southwest and northwest, which has been reasonably accounted for by the comparatively open country on the west and north, and the marked infrequency of easterly winds, because of the Alleghany range of mountains on the east.

That the meteorology of the country has very greatly altered in the last thirty or forty years, no one, who is at all familiar with its history, can doubt. Prior to that time, when winter came, it was the season of almost perpetual snow and ice, and the streams were frequently frozen over to such depth as to make road-ways and safe crossings for the heaviest wagons and teams, besides render-

ing it exceedingly difficult for farmers and others to care for and sufficiently water their stocks. It was then no uncommon occurrence for merchants to have their goods sledded from Baltimore to Wheeling, and even farther west; and travelers, in either direction, employed vehicles of this class instead of the slow stage coach, when might be heard all along the line of the great national highway, "the merry tinkle of the little bells which announced the speeding sleigh." When summer came, it was as uniformly the season of warm, dry weather, and abundant harvests of grain and fruit, but with complete arrest of navigation in the Ohio, as during the winter. Now, there is not such wide difference in the temperature, and hygrometrical and electrical conditions of the air, which, as a rule, used to mark and distinguish the seasons. The winters are far more open, rain and wind storms more frequent, and the water is so often at flood-tide, both in winter and summer, that navigation is not seriously interrupted, either from ice or low water, for more than a few days, or at most, weeks, at a time. This change or modification of the meteorology of the country, and the seemingly increased volume of water observed in recent years, has very properly, no doubt, been attributed to the clearing of the forests and consequent denudation of the surface of the elevated country along the Ohio and its tributaries.

The last three years have been remarkable for a high temperature, the frequency of storms, rapid evolutions of lightning, terrific thunderbolts, and heavy rain falls. Especially will the people of Wheeling remember the year 1869 as having afforded an unusual number of such occurrences. It was between 2 and 3 o'clock of the evening of the 28th day of May, just after housekeepers generally had completed their accustomed spring cleansing, and the Street Commissioner the task of putting the streets and alleys in the best condition possible for dry, warm weather—in a word, when the city could boast of general cleanliness—that the greatest *flood*, and most terrific wind and *hail storm* ever known in this region of country, swept over the city, doing an amount of damage beyond the power of description. The direction of the storm was from the north and northwest, and passed over at least two-thirds of the city. Its boundary lines were well marked, being about five miles in length and two miles at greatest breadth. Besides, thousands upon thousands of broken windows, including the heaviest plate glass, (in many instances the shutters also,) and

roofing, made of tin and slate, perforated as if by musket shot, the destruction of shrubbery and vineyards, stripping, and even killing, fruit and forest trees in its course—the cellars in the northern and central portions of the city were filled to overflowing with water, mud and *hail stones*; sewers were torn up by the flood, and the streets and alleys were embedded in slime and filth consequent upon the mighty deluge that rushed from north to south and from east to west. In the very heart of the city, immense piles of hail, and surface *debris* from the high grounds, completely obstructed the streets, and notwithstanding a large force was at once detailed to remove the accumulated filth and repair the sewers, &c., it was several days before order and even tolerable cleanliness of the streets and sidewalks could be secured.

The shape of the hail stones was a flattened sphere, containing an opaque nucleus as large as a pea, around which was transparent ice, crystallized in stellate lines. Some of the largest measured five inches in circumference, and weighed over two ounces avoirdupois.

The duration of the storm was about a half hour, and while it raged, confusion and terror were marked on every countenance.



ETHNOGRAPHY.




THE divisions are English, German, Irish, Scotch, Welch and French, and the mixed bloods springing from the union of these with the Ethiopian race—Mulattoes. Individuals belonging to the first class, English—the descendants of early settlers and emigrants mostly from Pennsylvania, Maryland and Virginia—constitute at least *five-eighths* of the population; those belonging to the second class, Germans, about *one-fourth*; and next in importance in point of numbers, the Irish, who, excepting small numbers belonging to each of the classes last mentioned, constitute the remainder of the population. There are probably fewer negroes in Wheeling than in any other city of the same size in the United States. These persons have not multiplied since they obtained their freedom; if any difference, indeed, their number is now smaller than before the war; and in their habits and mode of life they have in no wise improved upon their former history. Not less than four-fifths of this population have traces of Caucasian blood, and their diseases are characteristic of the genealogical cross predominating. There are no very aged mulattoes to be seen; on the contrary there may be found several *negroes* who are far advanced in years—in other words, very old *black people*. And another fact which is not less worthy of remark—this: of the mulatto children born, very few, comparatively, reach the age of 5 years; and those who escape death in infancy and childhood and reach mature age, as a rule, are the walking monuments of the scrofulous diathesis and the consequent sufferers of many ills which attach as the penalty of a violated law of nature in their birth. The large majority of these people—negroes and mulattoes—of both sexes, continue to be the servants of the whites, and earn their humble living with commendable industry. They are generally temperate—I mean not given to the

habit of drunkenness. The white population is generally active and industrious; principally engaged in trades and manufactures, for which the city has become reputable. There are comparatively but few idlers belonging to either class, and hence the general prosperity which is well shown by the large number of real estate owners among mechanics and laboring men.



TOPOGRAPHY.

HE city is divided into seven wards, but its distinctive features are better recognized as North Wheeling—corresponding with the limits of the First and Second Wards; East Wheeling—the greater parts of the Third and Fourth Wards—which is bounded on the east and south by Wheeling Creek; Centre Wheeling, immediately south of the creek—the Fifth and Sixth Wards; Zane's Island, in the Ohio—the Seventh Ward; and, separated from the Sixth Ward by Caldwell's Run and an open *common* containing 25 or 30 acres, South Wheeling or Ritchietown; its length, along the Ohio River, between its extreme northern and southern limits, 4 miles, with a breadth of from two to eight squares. There remains but little of the surface in either ward that has not been entirely altered by the march of improvement—the cutting down of high banks and filling up of ravines, the conversion of low marshy and malarial districts into dry and valuable building lots, the accommodation of easy and regular grades in the streets and alleys, and, as far as possible, to secure needful drainage. In the very heart of the city whole blocks are built on the site of former swamps, deep ravines, ponds and sink holes—the soil used in filling being composed of every description; but notwithstanding the best-directed efforts to overcome or correct natural irregularities and disadvantages, the level of Main street, its greater length in Centre Wheeling, and also a part of Market street in the Sixth Ward, is lower by several inches than the immediate bank of the river. In this respect, South Wheeling—a considerable part of which originally was but little better than a quagmire—is particularly unfortunate, for besides suffering from the same difficulties experienced in Centre Wheeling concerning drainage, it is more exposed to disastrous overflows during unusual flood tides in the Ohio. These, however, do not

occur oftener than once in an ordinary lifetime, and hence are not much feared. Owing to its great length, Wheeling Creek is subject to sudden and very great rises, and then a rapid current. By this means the offensive matters flowing into it in its passage through the city from the slaughter-houses, piggeries, etc., of Fulton—the Brighton of Wheeling—a mile and a-half distant; the soap and tallow-chandler establishments, gas works, oil refineries and other manufactories along its banks within the limits of the city, the private and public sewers leading from the Third and Fourth Wards, are now and then completely gotten rid of, and all accumulations of filth swept from its banks and eddies. The ice market is supplied from dams two and three miles above its mouth, at which points the stream is free from putrilage.

This stream forms the northern boundary of Centre Wheeling, and separates the Fourth from the Fifth Ward. There were but few buildings of any kind south of the creek or in Centre Wheeling 35 years ago; and the large district of fertile bottom and table lands which were then cultivated in meadows and cornfields, as well as the swamp grounds thrown out as *commons* even at a much later date, are now occupied by hundreds of fine dwellings, several costly church edifices, many large manufacturing establishments and scores of smaller work-shops; and broad and busy streets present all the *signs* of the ease and hurry of a populous and prosperous community, with constantly increasing business wealth. In a word, one half of Wheeling, is now, “over the creek.”

Zane’s Island, or the Seventh Ward, across the main channel in the Ohio, and immediately opposite the most densely populated and business part of the city, is a little over a mile in length, with an area of 400 acres, and connected with the main land, on the Wheeling side, by a strong double track and safely anchored wire suspension bridge, having a length of 1,010 feet; and on the Bridgeport side, by a pier timber bridge 640 feet in length. The river in general is clear and rapid and of unequal depth, on account of the geological structure of its bed, which at many points becomes very manifest in dry seasons.

In October, 1870, a 10-inch water pipe, leading from the city basin was successfully laid across the bed of the river to the island, by the Sweeneys & Co., the enterprising contractors, and thus a long-promised and greatly-needed public improvement was accomplished, which at once increased the value of property in

that locality. It needs now but the manufacture of gas on the island to place the Seventh Ward on a level of advantages with the most favored parts of the city; and when this improvement shall have been accomplished, then, regardless of low grounds and the remote dangers of occasional floods and overflows, it will be the most attractive part of Wheeling. It has increased in population from 800 to 1,400 within the last five years, and the next five years, no doubt, will show even greater prosperity. It is crossed by the National turnpike road and Citizens' railway, the latter having been in operation only two years, and to its many conveniences may justly be attributed the late unusual improvement which has been going on in that locality, as well as along the line of the road generally.

The next district most needing improvement is South Wheeling. This part of the city is not supplied with water from the Basin, and the inhabitants are therefore compelled to rely upon springs, and *hard water* wells, from 40 to 50 feet in depth—1st, through 3 feet rich alluvium; 2d, from 3 to 6 feet brick clay; 3d, 10 feet loam; 4th, 35 feet gravel; 5th, 3 feet quicksand to river bed boulders; and walled in with brick and furnished with variously fashioned pumps and buckets. Neither is it supplied with gas; and this can scarcely be considered a less disadvantage than the manner of obtaining water. These disadvantages, however, will soon be remedied, either by the erection of new works for the supply of water and gas, or the extension of the present street pipes; then South Wheeling will present an inviting field for the erection of additional manufacturing establishments, and a new business life and rapid increase of population will mark its progress.

STREETS AND ALLEYS.

There are in Wheeling $3\frac{3}{4}$ miles of streets, and about the same distance of alleys. With a few trifling exceptions the streets intersect each other at right angles, and have a width of from 60 to 66 feet, with 11 feet sidewalks, paved with brick and flagstones; the alleys are 16 feet wide, and almost entirely unimproved. Of the streets, about $3\frac{1}{3}$ miles are paved with river boulders, and from $2\frac{1}{2}$ to 3 miles macadamised with limestone from adjacent quarries. The whole distance of paved alleys does not exceed 2 miles. The gutters, however, are generally well paved and curbed; and these, excepting $4\frac{1}{2}$ miles of street railway, together with good and suf-

ficient crossings, and gas lights on the most important streets, constitute the sum total of the street improvements in Wheeling.

In many parts of the city, underlying the surface, is a substratum of tough, yellow clay, which prevents infiltration, and in wet seasons, secures an abundant supply of mud in the streets and alleys through which—under the excuse that they are “good scavengers”—the hogs roam without restraint.

The alleys are the receptacles of all manner of garbage filth, and for that reason, in their present unimproved condition, constantly endanger the public health. As a sanitary precaution they should be paved without further delay, and thus also while protecting the health of the people, there would be saved annually to the City Treasury thousands of dollars which are now almost uselessly expended in trying to do that which, in their present unpaved condition, is impossible—that is, keep the alleys clean, and free from disagreeable odors in warm weather. First, pave and sewer the alleys of a city—then, the streets will take care of themselves.

On many of the streets the sidewalks are shaded by the Lombardy poplar, ailanthus, linden, catalpa, maple, locust, with here and there a magnolia; these not only give beauty to the streets and add greatly to the comfort of the people, but chemistry has demonstrated the usefulness of trees and other plants in a city in removing carbonic acid and restoring oxygen to the air for which they are the only agents in nature.



DRAINAGE AND SEWERAGE.

DRAINAGE and sewerage, though so closely allied, have very different purposes in the economy of health, and are equally important as sanitary protectives. The drainage from the hillside is very rapid, and, on the occurrence of heavy rains, the accumulation of water at certain points of intersection is sometimes so great as to completely deluge the streets below, causing serious damage to the sewers and cellars. On the lower and more level grades, following the course of the most important streets—south and west—sewers are provided which empty their foul contents into Wheeling Creek and the Ohio. These were constructed many years ago, and are open at various points of intersection for the reception of surface and gutter drainage. The gases—mainly sulphuretted hydrogen, sulphide of ammonium, carbonic acid and nitrogen—which they emit into the atmosphere render several important localities exceedingly offensive at certain seasons, and especially at night. The greater parts of East, Centre and South Wheeling are not yet completely sewered, and the grounds being low and flat, surface or gutter drainage is defective. The Island has been almost entirely neglected in respect of sewerage outlets. This matter must very soon receive the attention of council, because of the rapid increase of population in this part of the city.

The drainage of a city, however, may be complete, and yet, if the house drains are untrapped or out of repair, most disastrous results may follow. Indeed, the danger from the admission of poisonous gases is all the more probable if the *sewers* are perfect and impervious. A prudent householder will, therefore, look closely to the condition of his drains. If they are leaky, or in anywise become obstructed, or if the kitchen *sink* is left open, especially at night, the most noxious gases from the sewers may fill

the house, even to the sleeping apartments, and poison and kill the family. All modern houses, of any pretension, are built with water-closets, stationary washstands and bath-tub, on the floor of the sleeping rooms, which are thus in direct current of communication with the air contained in the sewers, the open mouths of which, in Wheeling, are exactly in position to receive the full force of the west and south winds. Besides drainage directly into the sewers, there is scarcely an alley in the city which is not the receptacle daily of more or less kitchen slops, soap suds, and other refuse from houses, thereby contaminating, not only air, but the water of the yard wells also, in those districts which are thus supplied. These slops are poured out through *spouts* and other foul conduits—some of which convenience three and four families in the same house—and keep the alleys constantly filthy.

The present system of sewerage in Wheeling is singularly defective, and the subject should receive the immediate attention of the City Council. While it is happily very true—notwithstanding the unpaved condition of so many of the streets and alleys, and consequent accumulations of all manner of garbage filth, with its constantly exhaling gases—that we can to-day boast of a state of public health only equalled in the most salubrious rural districts, and a low death-rate scarcely witnessed in any other city of the same size in the United States, it should be remembered that the population is rapidly increasing and becoming more and more crowded, without a corresponding extension of the limits of the city, and to continue the blessing of good health among the people will require additional sanitary provisions and protectives—these mainly, a more extensive system of sewerage and thereby better drainage, paving the unpaved streets and alleys, a prohibitory *hog law*, the many dilapidated sheds and dens either torn down or their occupancy prohibited, and the entire abolition of the old privy system with its stinking cess-pools.


All these reforms are practicable whenever public opinion recognizes their expediency, and gives the necessary authority for their execution; and it is as much the duty of health officers to *make* public opinion in the good work of sanitary improvement, as it is to compel the removal of a nuisance.

It is the experience of all cities that, as improved works of sewerage and water supply go into operation, the death-rate falls. In Liverpool, as the foul alleys are cleared up, and the poor who

had lived in cellars are brought to the light of day, and cleanliness enforced both in the alleys and in the houses, the death-rate falls. And so it is everywhere, that "the improvement of public health, as expressed by that unerring guide—the death-rate—corresponds with all the means by which air and water are kept free from pollution."



PRIVATE DWELLINGS—VENTILATION, ETC.

ONSIDERATION of this subject involves, not only the art of Architecture, which was well established two thousand years ago, but also the modern problem of ventilation in its relations to oxygen and to animal life.

It is the common boast that every man's house is his castle—that we are a *free* people, and the earnest advocates and patrons of those arts and sciences which tend to prolong life and increase the daily sum of human happiness; but alas! how frequently is it the case, even in the midst of boasting and fancied security, that we harbor a most deadly enemy who has complete mastery of the premises; whose unrecognized, because habitual, poisonous breath taints every apartment from cellar to garret; and that we are, indeed, his slaves and his victims, because of ignorance chiefly chargeable to the architect and the builder. If a man build a house, he is at once involved in the difficult problems of ventilation, heating and drainage, and his knowledge and appreciation of their sanitary value will influence and determine, in a great measure, the health of the occupants, not only of the family residence, but of the factory, the workshop, and the school-room, where men, women and children are compelled to pass the whole of the day; and of the visitors of churches, theatres, and other places of amusement and instruction, where, most frequently, ventilation is ignored, and the laws of cubic space, if not unknown, are generally disregarded.

Fifty years ago the physiology of respiration was not understood, and it is only a century since oxygen was discovered. Now, however, nothing is better established than that foul and putrid air is a most prolific agency in the production of disease, but how to drive

out the poison from the household, from the workshop, from the manufactory, from churches and public halls, from the school-room, etc., and supply its place with the great natural disinfectant, antiseptic and purificator, pure fresh air, of which, under all circumstances, every human being should have at least *one thousand cubic feet* every hour, is the question of great difficulty.

When the fact is stated that most of civilized races spend about half their lives in bed, the importance of well aired sleeping apartments can be appreciated. The great source of impurity in sleeping rooms, is the organic matter rejected by the lungs and skin, especially in disease, which attaches to the furniture and clothing, and is positively more deleterious than carbonic acid. It possesses a foul, unmistakable odor, which may at once be recognized by the sense of smell, but association and familiarity, so far from quickening the sensibilities and begetting increased disgust, very soon so blunts the perceptions that the sickening, poisonous breath, laden with organic germs, may be quaffed without the least consciousness of offense or danger. The amount of air actually rendered impure by respiration, cannot be compared with that required to absorb and render innocuous the organic germs from the bodies and clothing of those occupying a room. Indeed, it has been asserted that ten per cent. of carbonic acid mechanically mixed with common air, is not so detrimental to health as *two* per cent. in air that has been poisoned by respiration and the exhalations from the lungs, skin and body clothing.

The complete remedy is a regular and constant supply of fresh air from without.

No contrivance has as yet been invented which will dispense with that most economic and thorough means of ventilation—the great natural ventilator of a room—the *open fire-place*—which becomes all the more efficient if a fire burn upon the hearth, and an inlet for pure air exist at the window. The interchange between two strata of air of different temperatures will be extremely slow, unless they be mixed by agitation. As the expired air rises from its warmth, and finds no outlet, it accumulates at the top of the room at the expense of cubic space for respiratory purposes, hence the importance of a window let down at the top in the ventilation of an occupied room. A very simple but most valuable contrivance has recently been invented—Kepner's patent balance sash—which, because of its real value, it is to be hoped will go

into general use in all houses where window cords and weights are not already employed. Messrs. J. A. Holliday & Son, of Wheeling, have the exclusive right of the patent for West Virginia and Ohio. Stoves and furnaces, though convenient and economical modes of warming houses, do not favor or assist the ventilation of a room, and are, therefore, far inferior, in a sanitary point of view, to the open grate or fire-place. It is more difficult to ventilate a close room in summer than in winter, for the reason that there are no fires in summer to create a draft or disturb the air, but it may be sufficient to open the windows at the top and bottom, and the fire-place, which should never be closed at night when the doors are shut. In cool weather, "instead of asking ourselves," says Dr. George Derby, of Boston, "with how little fuel can I warm my house, by stopping the flues and the beneficent window-cracks which the carpenters have left, the question should be, how much can I afford to *pay* for fresh supplies of pure air, moderately and equally warmed and distributed without waste? I cannot help believing that the sum of family health and happiness, in a generation, would be more increased by liberal expenditures for this purpose than for any other." Again, he says of the cost of pure air, "The best way is to freely admit that it is expensive, but worth the money it costs."

But there are other consumers of oxygen than human lungs, among these are lamps and gas burners, each of which consumes as much oxygen as a healthy adult person, and is constantly evolving carbonic acid.

Concerning the poisonous nature of carbonic acid, physiologists and chemists have widely differed in opinion. Diluted with two parts of air, it has been used as an anæsthetic, and its harmlessness and really refreshing qualities, as dispensed at the soda fountains, is well understood. Dr. Taylor, *Med. Jurisp.*, p. 711, says: "It is absolutely necessary to make a distinction between contamination of air by the addition of a proportion of free carbonic acid, and the case where this gas is produced by combustion of respiration." According to M. Bernard—*Substances Toxiques*, p. 137—it is not poisonous, and that when an animal dies from breathing this gas, its death is owing to the mere want of respirable air. He, therefore, with many others, considers its action to be purely negative, like that of nitrogen—that it operates not by poisoning, but by suffocation. An important distinction, however, is to be made

between carbonic acid and nitrogen, since the former is readily absorbed by the blood. Dr. George Derby, in his admirable little book—*Anthracite and Health*, p. 37—thinks carbonic acid “really possesses active noxious properties of its own, and that when respired its effect is narcotic.”

M. Guerard is of opinion that “carbonic acid is rendered more fatal by the presence of carbonic oxide”—an active, inodorous poison—one volume of which, says Leblanc, diffused through one hundred volumes of air, totally unfits to sustain life; “and, that a quantity of each, which, if respired alone, would be innocuous, may become fatal to life if respired in mixture.” Carbonic oxide, the deadly gas just referred to, is produced abundantly in combustion of anthracite coal, and may be recognized by the pale, blue flame that flickers over grates, stoves, and furnaces. Its poisonous action is displayed chiefly on the nervous system, causing giddiness, difficult respiration, confusion of ideas, languor, and sometimes acute pain, etc.; and is the author of countless ills, where hard coal is the fuel in general use. But, even then, there are many families who will not, cannot have it in their houses, because of its narcotic, poisonous effect; and not a few habitually substitute—regardless of expense and soot—our soft or bituminous coal, which is entirely free from the dangers just described as belonging to hard or anthracite coal.

Very different impressions are produced by different kinds of fuel—hard coal, soft coal, and wood—and by many persons the kind of *furnace* (if one is used), can at once be declared by the *quality* of the air in the rooms: that is, can distinguish a *hot air furnace* from one in which the air is conducted through coils of pipe containing either *steam or hot water*. In houses warmed by anthracite stoves and furnaces, delicate varieties of plants do not thrive—unless great care is taken, they soon wither and die; and for the same reason, hot air anthracite furnaces cannot be used in green houses.

The degree of relative *humidity* which the air of a room should possess for healthy respiration, is a subject of very great importance. Man’s tolerance—his wonderful adaptation to the circumstances by which he is surrounded, is too often forgotten in reasonings upon the question.

“The human body,” says Dr. Derby, “cannot be regarded as an inanimate hygroscope substance liable to warp and crack

like a piece of furniture. A close analogy may be discovered between the capacity not only to bear, but to enjoy the highest health under extreme alternations of both temperature and humidity. Animal heat is maintained at about 98° , whether the temperature of the air is 20° below zero or 100° above. It by no means follows because the air is dry that the evaporation from the human body is in proportion to its aridity, although this no doubt has an effect. But, supposing this excessive evaporation were proved, it still remains to be shown that the effects upon health are injurious. A man is in himself a reservoir of water, three-quarters of his whole bulk being composed of that element; and he is also a great evaporator, giving off by the skin and lungs, according to the best authorities, from 25 to 40 ounces, or about a quart of water per day. This exhalation is doubtless controlled, limited, and regulated by the nervous system. Certainly knowing these facts we may at least doubt the expediency of adding the evaporation of water to the heating apparatus in any crowded assembly. A theatre or lecture-room containing 2,400 people is already provided with an evaporating apparatus, throwing into the air 25 gallons of water per hour, and under such circumstances the air soon becomes saturated unless frequently renewed. That saturated, warm air is exceedingly oppressive, is a fact which any body recognizes in the dog-days of August."

The tendency of a moist atmosphere to combine with organic impurities has already been stated, and for many other good reasons a dry quality of air should be preferred.

Dr. Alfred L. Carroll, in his invaluable little treatise—"Hygiene in its Relations to Therapeutics"—says:

"With regard to the hygrometric conditions of the air, we find two kinds of action—on the pulmonary and cutaneous surfaces. Dry air is a very bad conductor of heat; hence, in a dry, cool atmosphere, the temperature of the body is lowered chiefly by radiation. On the respiratory organs, however, dryness of the air has a directly cooling action, owing to its affinity for moisture. The capacity for moisture, or point of saturation, varies enormously at different temperatures; for instance, 100 cubic feet of air at -4° Fahr. will contain but 6.6 grains of water, and at 104° will contain 216 grains. Now, if the amount of water present in a given volume of air be very far below the hygrometric capacity, this air will absorb water by evaporation until it is saturated, or it may be greatly reduced in temperature before it will part with any moisture. * * * * Thus, the air of a chamber containing 1,000 cubic feet may be saturated at 32° Fahr., (its moisture representing, so to speak, 100 — 100); but if it be heated to 75° , this relative moisture will be reduced to about one quarter, or 25 — 100, and more than a half pound of water must be added

to saturate it. The pulmonary action, under the latter circumstances, will be subjected to a refrigerating and desiccating process, until the requisite moisture is supplied. * * * * By a seeming contradiction in physics, while cold, dry air, through its non-conducting property, acts in some sort as a conservator of animal heat, hot, dry air, on the other hand, is to a certain extent a cooling agent, owing to the rapidity with which evaporation of the perspiration occurs. *Vice versa*, while a cold, humid atmosphere is a speedy refrigerant, warm, moist air augments the bodily heat."

In Wheeling there are, perhaps, not a dozen families, all told, who for any purpose use anthracite coal. Bituminous coal of the best quality is abundant and cheap, and is, therefore, used without stint, in grates, heating and cooking stoves, and in furnaces—in the latter, however, much trouble occurs from the abundance of soot which is deposited in the flues, unless the coal is coked, then it becomes a cheap and excellent fuel for furnace purposes.

A slow, combustion furnace—"the Metropolis"—which is well adapted to the use of soft coal and coke, has recently been introduced in Wheeling by B. F. Caldwell, Esq., one of our most enterprising merchants. For durability, giving out uniform heat and producing a healthy atmosphere, cleanliness, economy of fuel and labor, this furnace is certainly a very great improvement upon all other furnaces heretofore introduced. It has been adopted by the Board of Education for one of the finest school buildings in the city, and it has also been put up in several private houses, and gives complete satisfaction.

At least three-fourths of the houses are built of brick. The frame or plank houses are mostly found on the Island and in the extreme northern and southern portions of the city. The houses generally are well built, and 1,200 of them supplied with gas and with water in-doors; the remainder, from convenient out-door hydrants or from wells, and lighted by coal oil lamps. All told, there are 265 private *bath tubs*, on which is levied a special tax.

While the city can boast of many magnificent private mansions, it must be confessed that there are also many miserable abodes along the alleys and on the outskirts of the city, places totally unfit for human habitation, which are tenanted by the few very poor—negroes and whites, men, women and children, cows, dogs, pigs and poultry. There are several localities which are principally occupied by these wretched hovels—in "constructional partner-

ship" with privies, pig-sties or other depositories of filth—whose happy families are equal to so many *menageries*, and we have but to look upon the wretched shelters to learn the character of the occupants. In some of these places the buildings are partly underground, have no drainage, and in wet weather soaked into by surface water or sewerage. The noxious effects of living in basements and cellars and ill-ventilated apartments are apparent in the mortuary returns of all cities; but what care the owners of such tenements—the landlords of the miserable rookeries? What care they for the laws of health, for the safety of their neighbors, so the rent comes from these unguarded dungeons—these slaughter-houses of women and children!

From such huts or habitations come regularly the largest returns of infant mortality, usually ascribed to CONVULSIONS—the result of reflex disease, excited by bad air and improper food; which proves that there is no greater mistake among the people that "exposure and filth make children hardy." Here, also, every importation of small-pox finds its first lodgment; and from these prolific centres of infamy and disease, the peace and health of the city are constantly endangered. Yet, these wretched hovels actually bring a higher rate of rent than good rooms in respectable houses command; and many of their owners have acquired ease and comforts from the enormous profits thus obtained from the earnings of their disreputable tenants. Every one of these places—for they are not fit to live in—should be declared a *nuisance* and occupancy prohibited. Then would the several neighborhoods take on the spirit of improvement, good houses would take the places now occupied by miserable dens, and good health and virtuous behavior would be greatly encouraged. The truth is, if we would secure our own immunity from disease, we must, *nolens volens*, look after the health, the conduct and safety of our next-door improvident neighbors, who, from ignorance or indifference, care nothing whatever for their own nor the public health. Every city possesses its share of this class of people, among which epidemics first spring into life, and fatten for an indiscriminate harvest of death.

In certain districts near the hill, and in parts of East Wheeling, as well as in parts of the Fifth and Sixth Wards, there are many damp cellars because of the toughness and unusual depth of the clay substratum; and far worse difficulty is experienced from this cause with many of the privies, which are after the *old style*, and in

wet seasons full of water and constantly offensive. Where the *gravel* bed is reached by the privy vault or well, no such trouble occurs—the accumulation of water—and by attention, with the use of copperas or other disinfectant and deodorant, it is possible to prevent very offensive exhalations, but even under the most favorable circumstances the old privy system involves a serious nuisance.

A DAMP CELLAR, no less than a foul privy, is a constant and very great source of danger, because its unhealthy atmosphere reaches every room in the house, and may sicken unto death every member of the family. If it contain provisions or other articles in a state of corruption, the danger is at once fearfully increased, and the most fatal consequences may ensue. If, instead of being simply *damp*, it contain water from surface infiltration, or from a defective drain or soil pipe, and the accumulation allowed to remain, particularly in warm weather, a gaseous poison is emitted, which may spread disease and death over a whole neighborhood. From these neglected sources of disease the residents of many a palatial residence have been consecutively and fatally attacked. The attention of every housekeeper should, therefore, be particularly directed to the condition of the cellars and vaults attached to his dwelling, and the necessary precautions taken to prevent the accumulation of every species of filth or corruptible matter. It is in vain to expect that all the advantages resulting from domestic cleanliness shall be realized when the dirt, carefully expelled from the parlors, sitting and dining rooms, is permitted to take undisturbed possession of the less frequented parts of our dwellings. To preserve health, the process of purification must visit every apartment, from garret to cellar—the latter, in particular, should be swept frequently, and the dirt thus collected immediately removed. The windows should be so constructed as to allow fresh air and sunlight, besides which, to insure perfect ventilation and dryness, the doors should be kept open several hours every day, except in damp or rainy weather. An excellent means of purification of a cellar is whitewashing with lime, and this process should, on that account, be performed at least once every spring and summer. No expense or trouble should be spared to prevent the entrance of water into the cellar, or to drain it off, if possible, by means of sinks penetrating to a stratum of gravel. On no account should the drainage pipe communicate with a *sewer* or privy cess-pool, unless most securely trapped.

"Another source of danger," says Dr. Derby, "in our houses similar to that which we have just referred to, yet seeming to require special mention, is from the retention of decomposing materials in furniture. Dining room carpets receive a great deal in the *debris* of food. It is carried about in the air, and, in combination with vapor, attaches itself to woolen and cotton textures of every kind, to paper-hangings—to whatever will absorb moisture. A house whose entry smells musty is dangerous. Avoid it. Don't live in it. Keep the children out of it."

By a strange contradiction of fashion, the carpenters put large windows in the houses to let in the sunlight and ventilate the rooms, while housekeepers as regularly cover them up with curtains and shutters, and, for their pains and lack of knowledge, they often pay for their darkened rooms a mournful penalty. Better far that they worshipped the god of day as the source of life and light and heat. They hunt the sunlight for their tender house plants; why not do the same for themselves and their children? Who woos Hygeia at her favorite shrine receives from her rosy fingers the crimson-tinged cheek and sparkling eye—the reward and badge that distinguish her votaries.

"Then let in the sunlight," writes Prof. Samuel Kneeland, in "Good Health," "to drive away the mould and mustiness which lurk in your halls and closets, and even in your parlors; far better that the carpets and chairs and curtains should fade, than that the rosy tints of health should disappear from the lips and cheeks of your children. The rays of the glorious sun are necessary for vegetable and animal growth, and, above all, necessary for the healthy growth of the human being. Open, then, your curtains and blinds, and see how quickly the sun will change the atmosphere of your house, bringing light and warmth into musty corners, vivifying the air of every room, reddening the cheeks of the pallid children, and giving to every member of the family a vigor before unknown."



WATER SUPPLY.



THE condition of health and probable duration of life of a people may be correctly measured by the quantity and quality of their water supply. Indeed, health can as little be supported without pure water as without pure air. It is the natural drink of plants and animals of every description, and is the only article which can fulfill those needs for which the introduction of a liquid into the human system is demanded. The ancient Romans well understood the sanitary value of pure water. Even to this day, though so far fallen from her high estate, Rome is supplied with good water, conveyed from a great distance, by means of aqueducts, built in her days of early splendor and dominion. But this abundant and far seeing provision did not gratify the desires or demands of the people; for, to further secure the purity of drinking water, the process of boiling was frequently adopted to prepare it for use. For this purpose public buildings were specially erected and set apart, called *Thermopolia*, from the names of the hot springs in Greece.*

River pollution from the sewerage, and other supplies of corruption of cities, has assumed such fearful proportions, that the subject is now one of the great sanitary questions of the day; and thinking men have asked—"Is industry free to tumble out whatever horror or refuse it may have arrived at into the nearest crystal brook, regardless of gods and men, and little fishes; is free industry free to convert all our rivers into sewers?" Says Dr. Gairdner, "It is ours to use air and water, and then pass them on; but woe to the

* Vitruvius informs us that as an evidence of the practical wisdom of the ancient Romans, who were often regulated in their conduct and opinions—especially in military matters—by the Augers and Soothsayers, they frequently consulted the appearances presented in the livers and spleens of animals, with a view of ascertaining the state of the air and waters of a country, the salubrity of its alimentary productions, its pasturage, etc., and to regulate their choice of sites for the building of cities.

man or the community that detains or imprisons these, his servants of the hour, in their further execution of God's endless work."

The people of no city are happier in their supply of drinking water, both as to quality and quantity, than the citizens of that portion of Wheeling, which is supplied from the Ohio River. The Basin or Reservoir is located on the side of Wheeling Hill, 275 feet above the bed of the river, 50 or 60 yards from the summit, and 350 yards south of the National Turnpike road crossing. It is cut down to the depth of 9 feet through a limestone stratum, which forms its walls and also its pavement, having a capacity of 781,320 gallons, and supplied by force-pumps. From the Reservoir the water is sent out along the streets and alleys, at an average depth of 4 feet beneath the surface, in iron pipes, cast at Wheeling foundries, varying in size from 3 to 20 inches in diameter.

On account of the tortuous course and rapid current of the Ohio, the water is in constant agitation, and thus, in a great measure, freed from existing organic nitrogen or other impurity, either in suspension or solution. To those unaccustomed to its use, it is often repulsive because of its muddiness, but the mud itself, an argillaceous compound made up of very fine particles of silicious matter, is really *protective* as an efficient purifying agent by which much of the impurity resulting from the solution or suspension of animal or vegetable matter, in process of decomposition, is either destroyed or carried down with the sandy particles. The amount of solid matter varies, of course, with the turbidness of the water, being more in rainy than in dry seasons.

The *mud* is also protective against lead poisoning to those persons whose houses are supplied with water from the city basin. It is a well known fact that water, in passing through lead pipes, may become impregnated with the metal, and the *purser the water*, the greater the danger of poisonous absorption.

"The first chemical action of water upon lead is usually that of oxidation. The oxygen, which enters into combination with the metal, comes from the air always present in water, or possibly it may come from the water itself through chemical decomposition, the result of galvanic action. The oxide of lead is a soluble compound, and quite poisonous. If the results of the contact of water with lead were to stop here, not a family could use leaden pipes with impunity. The oxide would continue to form as fast as it was washed away and dissolved by the current, and shortly the whole structure would be destroyed. But most waters contain, or hold

in solution, another element, carbonic acid, which readily combines with the oxide, and forms a new salt. This is the carbonate of lead, and fortunately is *insoluble*. The first action, then, of most waters upon lead is to form upon the surface a coating of the white oxide of lead; the second action is to change this dangerous soluble oxide into a hard insoluble carbonate, and this, adhering to the whole interior surface of leaden pipes, prevents further contact of the water with the metal, and all decomposition ceases. This is a plain statement of the way in which lead is usually acted upon by water; and if there were no disturbing agencies to come in and interfere with these results, we should hardly require safer or better water pipes than those constructed of lead.”—*Boston Journal Chemistry*, Aug., '70.

In Wheeling, no case of lead poisoning has occurred from this source. The lead pipes leading from the streets to the houses are soon perfectly lined with a thick crust of earthy matter deposited from the water, which may have much influence in preventing the absorption of the lead and the occurrence of poisoning.

In those portions of the city which are not yet entirely supplied from the basin—South Wheeling and the Island—well water, impregnated with lime, is used; but the best of the wells contain water not half so good and pure as river water.

A DANGEROUS WATER PIPE.

The positively dangerous character of the *galvanized iron pipe* when employed for conducting water to be used for culinary purposes—which is so clean and attractive to those who do not understand the nature of this zinc coating—ought to be known by every builder and housekeeper. Instead of fulfilling the promise and boast of manufacturers and dealers, that it will not oxidize or *rust* like ordinary iron pipes, the fact is that it is even more liable to rust than clean iron. The interior coating is immediately attacked when water is let into it; and sometimes, in the space of forty-eight hours, it is entirely decomposed and removed—resulting in the poisonous salts, oxide, carbonate, and chloride of zinc. They are made by immersing the common iron gas-pipes in hydrochloric acid, and then immediately placing them in a bath of melted zinc, when the zinc amalgamates with the surface of the iron, forming a superficial covering of the metal, and thus they are “galvanized.”

Besides lead and galvanized iron, many other kinds of pipes for water conduction have been employed—tin-lined lead, tin, plain

iron, gutta-percha, brass pipes, clay pipes, a carbon water-pipe—made principally of asphalt and sand, but which, because of its cost, is now out of the market ; and, besides these, there have been made the glass and the porcelain-lined iron pipes. Under ordinary conditions, where the water is conducted from rivers or open reservoirs, leaden pipes may be used with little fear of danger, Plain iron pipes are perfectly safe. This subject is thoroughly discussed in the October and November Nos. of the "*Boston Journal Chemistry*," '70.





ADVANTAGES OF THE EARTH CLOSET.



HAT "there is nothing new under the sun" finds a forcible and most happy illustration in the recent discovery that *dry earth* is the greatest of all purifying, disinfecting and deodorizing agents. The use of earth was prescribed to the Israelites 1451 years B. C., (Deuteronomy, xxiii, 12 and 13,) and it is a matter of common observation that our domestic carnivora—especially dogs—render putrid meats and bones more savory by burying them in the earth; and it is further known of these animals that, in order to rid their bodies of the fetor of the skunk, they scratch and wallow in the earth until they have made themselves as dirty as possible. It is also equally well known that the Indians are in the habit of employing the same process of purification (burial) to rid their clothing of the fetor of the skunk.

With these suggestive lights—Mosaic, instinctive and aboriginal—concerning the purifying property of earth, is it not passing strange that its wonderfully increased disinfecting power by the simple means of *drying* and *pulverization*, was not found out centuries ago? In 1858 an English clergyman, the Rev. Henry Moule, of Fordington vicarage, Dorsetshire, first publicly made known, in a pamphlet entitled "Health and Wealth," the fact that a small quantity of dry and sifted earth—say one and a half pints, or just sufficient to cover the deposit—is capable of instantly removing all foul odor of human *fæces* or *dejecta*, whether in the chamber or in the privy, and of correcting the disgusting and dangerous ills attendant on carelessness, negligence and ignorance in the accustomed management of the horrible vaults and cess-pools which distinguish the old privy system and disgrace civilization. After further investigations of the subject, the same author,

in 1863, contributed a paper—"Earth *vs.* Water for the Removal and Utilization of Excrementitious Matter"—to the "Journal of the Royal Agricultural Society of England." In these publications it was further shown "that, if within a few hours, or even a few days, the mass which would be formed by the repeated layers of deposit be intimately mixed by a coarse rake or spade, or by a mixer made for the purpose, then in five or ten minutes neither to the eye nor sense of smell is anything perceptible but so much earth."

It is but a little more than two years since the first complete description of the earth closet, which appeared in "Judd's Agricultural Almanac" for 1868, was published in America, and scarcely two years have transpired since the first Commode was imported.

A patent, both in England and in this country, has been obtained for the "self-acting" and "pull-up" earth closet apparatus, by which the earth, being placed in the hopper of the closet or commode, each deposit of *fæces* is at once covered, and all effluvia, fermentation, (which otherwise immediately sets in when water is added,) and exhalation of offensive and noxious gases completely prevented.

But, like many other valuable discoveries which from time to time have blest mankind, the earth closet *must* needs also have its opponents.* These, however, have been singularly few, and their objections have been completely met and answered by medical and scientific men—especially the sanitary superintendents of cities, both in Europe and in this country—who have earnestly and patiently investigated the subject. It has thus been abundantly established that if each stool or *fæcal* deposit be immediately covered with *fine dry* earth, (not gravel or sand,) "all offensive odor is instantly extinguished, fermentation and putrefactive changes are prevented, the moisture of the material is absorbed, and finally evaporated without carrying other matters with it, the particles are so brought in contact with those of the earth that such physical and chemical changes occur as to fix the organic compounds and render the mixture free from offensiveness, so that it may be kept in one's sleeping apartments without annoyance, and may be used again and again, effecting the same purpose as fresh earth."

Though so lately introduced in the United States, the new system is rapidly gaining favor and going into general use, because of the

* "London Lancet," March 6, 1869. Professor Rolleston.

entire fulfilment of all its great promises. For schools, hotels, railway stations, hospitals, prisons, military camps and stations, the factory, workshop, and wherever human beings are compelled to congregate, the advantages of the earth closet must at once commend themselves to all thoughtful governors and superintendents of such establishments and assemblies.

In the section on the ventilation of dwellings it has already been seen to what extent the exhalations from the lungs and skin are capable of contaminating the air we breathe. The residual and effete matters which are expelled from the alimentary canal and kidneys are not less offensive to the senses, nor active in the production and propagation of diseases.

The common prevalent privy system throughout our country is nothing less than an *abomination*, and it is well pictured by Prof. A. B. Palmer, M. D., in his recent pamphlet on "Dry Earth, as a Means of Disposing of Excreta." He says:—

"A hole is dug in the ground, often built up with mason work, and even with water lime in some instances, so as to retain its contents, and the fœcal and urinary deposits mingled with the slops of the chambers are thrown into it and left to ferment and putrify indefinitely, the new material constantly added, readily taking on the putrefactive processes already existing. All that does not pass off in offensive gases, poisoning the air, remains in the vault, or possibly passes into the moist earth and soaks its way with flowing water into a neighboring well. Some vaults are deep, admitting of deposits for many years, while others are superficial, their contents overflowing and saturating the surrounding soil. And when attempts are made at removal, the whole neighborhood is rendered horrible and dangerous. * * * One need not go very far in any country village, or in most cities, to see this general description realized in all its disgusting details, attended by the consequences to health and life already referred to."

In his most instructive pamphlet (1870) entitled *Earth Closets and Earth Sewerage*, George E. Waring, Jr., of Newport, R. I., says:—

"Out-of-door privies (those temples of defame and graves of decency), that disfigure almost every country home in America, and raise their suggestive heads above the garden walls of elegant town houses, are, I believe, doomed to disappear from off the face of the earth. Twenty years ago, every back yard in New York city was provided with one of these buildings; now, since the water-closet" (which, though a great improvement, may become a

most dangerous convenience) "has come into universal use, probably there are not twenty of them to the square mile."

The compulsory every-day exposure of health resulting from the habitual use of the out-of-door privy, is positively of the most serious character, but which is scarcely if ever thought of either by the patient or physician in dating the beginning and fixing the cause of illness; and thus thousands upon thousands of lives have been sacrificed.

"The privy stands, perhaps, at the bottom of the garden, fifty yards from the house, approached by a walk bordered by long grass, which is always wet except during the sunny part of the day, overhung by shrubbery and vines which are often dripping with wet, and exposed frequently to the public gaze. In winter, snow drifts block the way, and during rain there is no shelter from any side. The house itself is fearfully cold, if not drifted half full with snow or flooded with rain. A woman who is comfortably housed during stormy weather will, if it is possible, postpone for days together the dreadful necessity for exposure that such circumstances require." * * * * *

"I pass over now the barbarous foulness and the stifling odor of the privy-vault. It is only an unavoidable evil that these have been tolerated; but I cannot too strongly urge attention to the point taken above, and insist on the fact that every consideration of humanity, and of the welfare not only of our own families, but of the whole community, demands a speedy reform of this abuse."

Dr. Stramm, a German Epidemiologist of wide reputation, believes in the possibility of nearly annihilating many epidemic diseases by attention to cleanliness and other hygienic measures. He says: "Before erecting statues, building museums, and buying expensive pictures, towns should be relieved of bad odors and fermenting putrescence;" and adds, that "good privies are far higher signs of civilization than grand places and museums of art."

But how shall the reformation begin? How shall the main evil of the old system, if it can be called system, be gotten rid of—that is, the accumulation of fermenting excreta in the privy-vault, for which *stink* is no name? It must be dealt with in mass; but universal experience proves the almost, if not entire impossibility of dealing with it effectually short of removing the accumulation and filling the vault with fresh earth. If an out-house *must* be continued in use, the seat "should be so arranged," says Dr. Palmer, "as to admit of a tight box being placed underneath and protected from

rain. A quantity of dry earth should be obtained (the dust from the road, or the surface of the field or garden, collected in a dry season, or sifted coal ashes will answer, though earth sifted and dried is better) and placed in a box" convenient to the seat. "A small shovel or scoop should be provided, and after each use of the privy, a sufficient quantity of earth should be thrown into the box to simply but completely cover the deposit. When the box is filled, provision having been made for it in the construction of the privy, it may be removed without the slightest offensiveness."

It is estimated by Prof. Joy that "*one cubic foot of earth per annum* is sufficient for each individual, if it is systematically re-dried and used eight times over, which is entirely practicable;" but it must be *dry* earth, as "an earth-closet," remarks its author, Mr. Moule, "will no more work without dry earth than a water-closet will work without water." The quality here referred to is not absolute dryness, for the earth in the box or closet will always absorb a degree of moisture according to the humidity of the atmosphere, which amount, and even if it contain a little more, will not prove objectionable.

The danger of water-closets (even of the most improved invention), of sinks, and other conduits, has already been spoken of. It lies in the fact that they all lead into and communicate with sewers, or wells, which are far worse, and by this very means the atmosphere of the house may become poisoned from cellar to garret, and the price which must be paid for the privilege of exposure to such danger in all cities is not only the heavy municipal tax usually levied, but also the cost of repairs necessitated by the bursting of the pipes in freezing weather. It would be impossible to keep a water-closet in constant use in a sleeping room or sitting room without injury to health. An earth-closet can be kept at the bed side, anywhere in the house, without the least danger, and hence, even as a matter of convenience, its great superiority. The guests of the National Hotel, in Washington, in 1857, were poisoned by emanations from the privy, caused by obstructions from its sewers.

In a paper read before the chemical section of the Glasgow Philosophical Society, April 19, 1869, Mr. C. C. Stanford, F. C. S., says:

"Whatever may be the best, *the present water-closet system, with all its boasted advantages, is the worst that can generally be adopted;*

briefly, because it is a most extravagant method of converting a mole-hill into a mountain. It merely removes the bulk of our excreta from our cities to choke our rivers with foul deposit and rot at our neighbors' doors. It increases the death-rate as well as all other rates, and introduces into our houses a most deadly enemy in the shape of sewer gases. * * * The water-closet, with many apparent advantages, and with all our prejudices in its favor, carries an attendant train of evils, which I am fully persuaded will ultimately doom it to oblivion."

Nothing of these disadvantages and dangers can be charged to the use of the earth-closet. It meets every sanitary demand.

"Nothing," says Mr. Simon in his Ninth Report to the Privy Council, pp. 32-34, "can be said against the dry-earth closet. * * It has already become a recognized institution. It presents the best means at present known of confining a nuisance within its proper limits, instead of distributing it amongst our neighbors, and therefore merits our patient consideration."

Professor Palmer, in his pamphlet already referred to, says:

"We have seen the plan in operation upon a large scale at Fort Adams, Newport, R. I., where a large number of soldiers were using the earth-closets, and where there was an entire absence of all those odors which we have never before failed to perceive in well-regulated water-closets used by a large number of persons. We have seen the earth commodes in use in hospitals and in private dwellings, and, when proper care was exercised, with the most complete success.

"We have directed the use of earth in the sick room in a common *pot de chambre*, having a small quantity of *dry* earth kept in a pail in the room for that purpose, placed in the vessel before its use and immediately covering the evacuation afterwards, thus extinguishing all odor at once, and allowing the vessel to be emptied at the convenience of the attendants, with no disagreeableness whatever."

Dr. J. F. Head, U. S. A. surgeon, Fort Adams, says, (Jan. 24, 1870:)

"Early in August last a set of these closets was erected in one of the casemates, and since that time—or nearly six months—they have been in daily use by more than a hundred men. I have closely watched the experiment. *The result is perfectly satisfactory. No odor from the deposit can be detected in the casemate.*

"The labor of preparing, drying, and sifting the requisite earth is trifling, and (apart from the agricultural value of the product,) is repaid a thousand-fold by the comfort, safety, and certainty secured in the removal of the excreta, and by relief from the for-

mer nuisance of cess-pools and water-closets, which hereafter should never be permitted in a permanent fortification."

Professor Samuel W. Johnson, of Yale College, says:

"I am myself familiar with the use of dry-earth as a disinfectant and dryer of fæces. *Nothing can be more instant and effectual than its operation, and its use has every sanitary advantage.*"

In the Connecticut State Hospital, where the earth-closet system has been on severe trial for several months, Dr. L. B. Wilcoxson declares that "the deposit is completely deodorized, and is no more offensive to the sight or smell than an equal quantity of coal ashes."

Professor Francis G. Smith, M. D., of the University of Pennsylvania, says he has used the earth-closet "with entire satisfaction;" that it is "not only a great convenience," but likewise a great "hygienic improvement."

Dr. Addinell Hewson, of the Pennsylvania Hospital, Philadelphia, says:

"Having tested one of Moule's Patent Earth-Closets, (manufactured by the Earth-Closet Company of Hartford,) with my patients in the *Pennsylvania Hospital*, in a manner which may fairly be said to have been a very severe one, I am confident, that it not only warrants all that is claimed for it, but *fulfills all the requirements of such a convenience for a hospital as well as for a sick chamber, or for family use.*"

In the Maryland Hospital, Baltimore, after complete and satisfactory trial, Dr. R. S. Stewart recommends it to his "fellow citizens as one of the most important inventions of the age."

Dr. John H. Rauch, Sanitary Superintendent of Chicago, says:

"I have witnessed the practical working of the earth-closet, and am satisfied that under a great variety of circumstances, it affords the best means of disposing of night soil with reference to both sanitary and economical considerations. *It is particularly valuable in this city, and in all localities where similar conditions obtain with regard to drainage.*"

Dr. Geo. Derby, Secretary of the Massachusetts State Board of Health, says:

"Like other valuable discoveries, it seems surprising that nobody thought of it or applied it before. But the simple fact is, that the privy may be made as inoffensive as the corn barn, by the application of about a pint of *dry earth every time it is used.*

"This is one of the simplest and yet one of the most useful discoveries of modern times.

"Hereafter, if we are wise, we shall apply this simple means for the purification of vaults in every place where water is not used for that purpose, as in our great cities.

"In the country it will be invaluable, and whenever in private houses, cholera or typhoid fever, or any contagious disease, may occur, then should this principle involved in the earth-closet be adopted."—*Report Mass. State Board of Health.*

F. W. Tilton, Esq., Supt. Public Schools, Newport, R. I., gives testimony, Sept. 7, 1870, that during the past year, he has had the earth-closet on trial, and believes "*their sanitary value to be inestimable* where large numbers of children are brought together.

"They have enabled us fully to overcome what has hitherto seemed an insurmountable difficulty in the progress of school hygiene."

J. E. Alexander, Esq., Principal Classical Institute, Hightstown, N. J., has used the commode and earth-closet fixtures in his family and in his Institute, and says, July 30, 1870: "I consider them *indispensable*, and can cordially recommend them as sure to give good satisfaction" wherever they are properly used.

Those who have not had personal observation and experience must rely upon the testimony of those who have, and for that reason the above testimonials have been given, and with the hope that the people of Wheeling, to whom these pages are specially written, may be encouraged to exchange the *old* for the *new system*—the seething, horrible cess-pools of animal corruption—for the *inoffensive*, most *economic* and *convenient* earth-closet.

As now contrived, according to Mr. Moule's device, the earth system, with its accessories of closets and commodes, fulfills the following specific and most important objects:

(1) "To afford a comfortable closet on any floor of the house, which may be supplied with earth and cleansed of its deposits without annoyance or inconvenience. (2) A portable commode in any dressing-room, bed-room or closet, the care of which is no more disagreeable than that of a stove. (3) Appliances for the use of immovable invalids, which entirely remove the unpleasant accompaniments of their care. (4) The removal of the most fertile source of typhoid fever and various other diseases. (5) The complete suppression of the odors, which despite the comfort and elegance of modern living, still hang about cess-pools and privy vaults, and attend the removal of their contents. (6) The com-

plete deodorization of the bucket so commonly used in jails and prisons. (7) The realization of a fertilizer of material value to agriculturists."

In his paper on Earth-Closets, written for the New Haven *Palladium*, Prof. S. W. Johnson, says:

"The arrangements required to constitute an earth-closet are not necessarily complex or expensive. It is only needful that a space be had below the privy-seat, the bottom of which should be of flagging or cement, and a little above the ground level, or at least protected from the wet of rain and of the ground. This space should communicate with a shed at the rear of the privy, to hold on one side a load or two of dry, fine earth (not sand) or sifted coal ashes, and leave an equal room unoccupied on the other. Daily, or as often as need be, the droppings are covered with enough of the dry earth to absorb all liquid, and, when the space is filled, the mass is hauled out, raked over, and thrown to one side."

The plan of the closet may be varied to suit all circumstances or tastes; it may be built of oiled walnut, and highly polished, and occupy the study, the chamber, side by side with the wardrobe, or it may be made of rough boards and occupy the cellar. There are thousands of poor women and invalids who cannot afford a closet of even moderate expense, "yet to whom," says Mr. Waring, "it is especially desirable to avoid the exposure that the absence of conveniences within the house make necessary. Such conditions may be very easily met by a plan which, though less convenient, is no less effective than is the regular Moule's closet."

"A board box, of convenient size, not less than eighteen inches deep, may be fitted with a movable or hinged cover, with an ordinary finished hole. Unless the box is water-tight, its joints should be filled with putty, white lead, tar, or pitch. Three inches of dry earth should be spread upon the bottom. At its side there should stand a box of sifted dry earth or coal ashes, with a small tin scoop or cup. After each use of the closet, enough earth should be thrown into the box to simply cover the *feces*. A pint of earth is ample for the purpose. When this box is filled, its contents may be removed with a shovel and corn-basket, and it may be kept in the good woman's bed-room with as little offense as the stove or the chest of drawers."

The permanent earth-closet may be constructed and located to suit the wish of the house-keeper. If it is desired to have a closet on two floors, up stairs and down stairs (and there are many good

reasons why this plan should be adopted in all houses of modern pretensions), the earth-shaft should be built in one of the outer walls, so that it may be reached without entering the house. For this plan of construction see Figs. 1 and 2. The cost of this arrangement—a closet on each floor—is trifling, and need not exceed \$250.

But sometimes it is impossible to use the wall for such purpose, and it becomes necessary, if the closet is located on the second floor, to carry the soil-pipe directly through the first story, discharging it into the cellar. In that case, the manner of construction should be according to Figs. 3 and 4.

Figs. 5 and 6 represent plan of closets on *three* floors.

Fig. 7 represents the convenient "Closet in the corner of the Room." Figs. 8 and 9, sections of the same.

Figs. 10 and 11 represent the "Broadmoor Tank," or closet with movable tank on wheels. This arrangement is, of course, available for a closet in the house, under the wood shed, or in an out-house privy. This plan is in common use in England.

Figs. 12 and 13 represent the best and cheapest plans of constructing an earth-closet privy, to be seen either as an out-house, or to be situated in the stable, or under the roof of the coal-house or wood-shed.

Fig. 14: Plan of Hospital earth-closet.

Fig. 15 represents the portable *COMMODORE* or chair, convenient and safe for the chamber, the sick room, as well as for the family.

Fig. 16 is Mr. Geo. E. Waring's device for getting rid of kitchen slops, etc.: The cistern—a common kerosene barrel—is sunk in the ground until its open top is on a level with the surface.

The drain from the kitchen to the cistern is made of three-inch vitrified pipes.

For a complete description of this valuable contrivance (how it should be constructed, how connected with the house, and how managed to keep it in effectual order) see Mr. Waring's pamphlet on the Earth System.

A commode which is ample, with a daily renewal of the earth, for the use of eight persons, costs about \$30; and for the same amount a stationary closet may be put up in any unoccupied room.

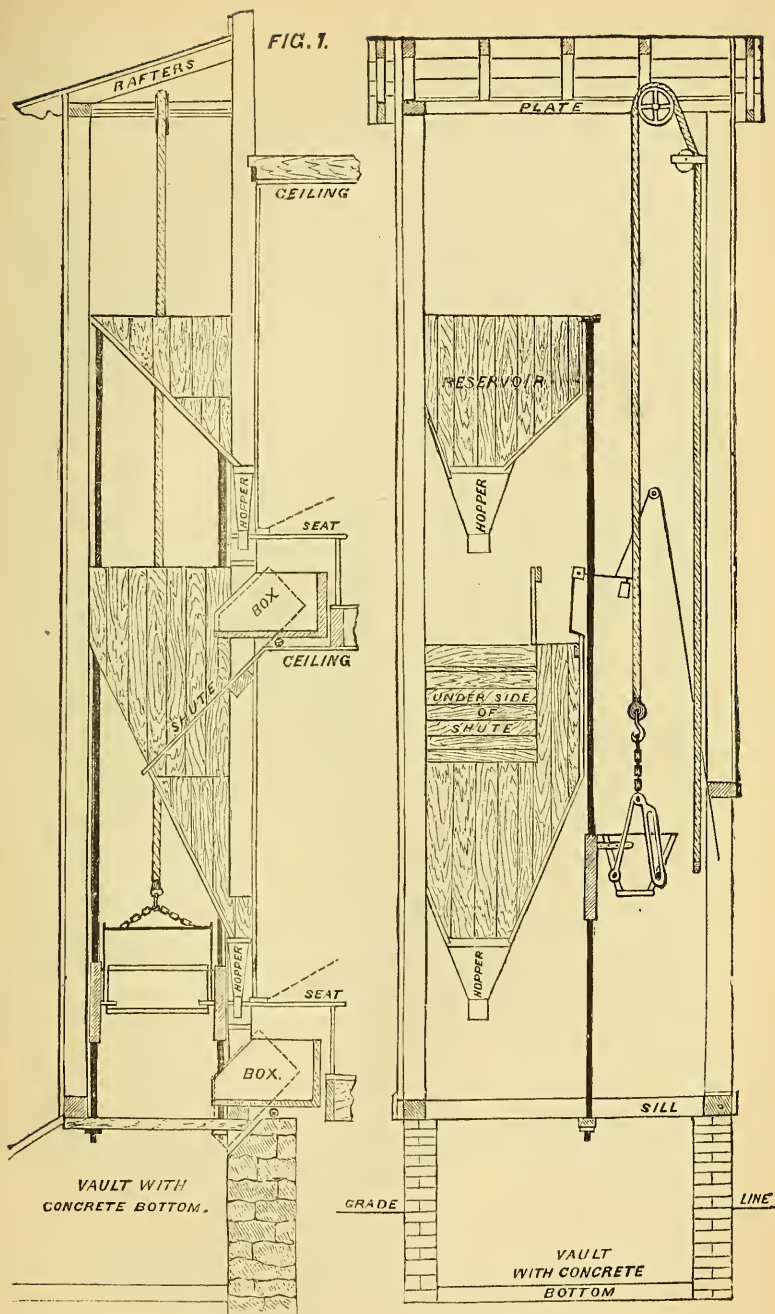
Mr. George E. Waring, Jr., who has given the subject of earth-

closets very great attention, and from whose excellent pamphlet the accompanying figures are borrowed, says:

“Nor need the benefits that the earth system offers be confined even to those who can afford this moderate cost, for this is necessary only for the sake of convenience. Any process by which the evacuations are immediately enveloped in dry earth or dry coal ashes, will accomplish the purpose, and the poorest cabin in the land, may, absolutely without cost, be supplied with some provision that will obviate the necessity for its invalids, and its women, to expose themselves in inclement weather.”



FIG. 1.



PLAN OF CLOSETS ON TWO FLOORS,
WITH HOIST AND DUMP.

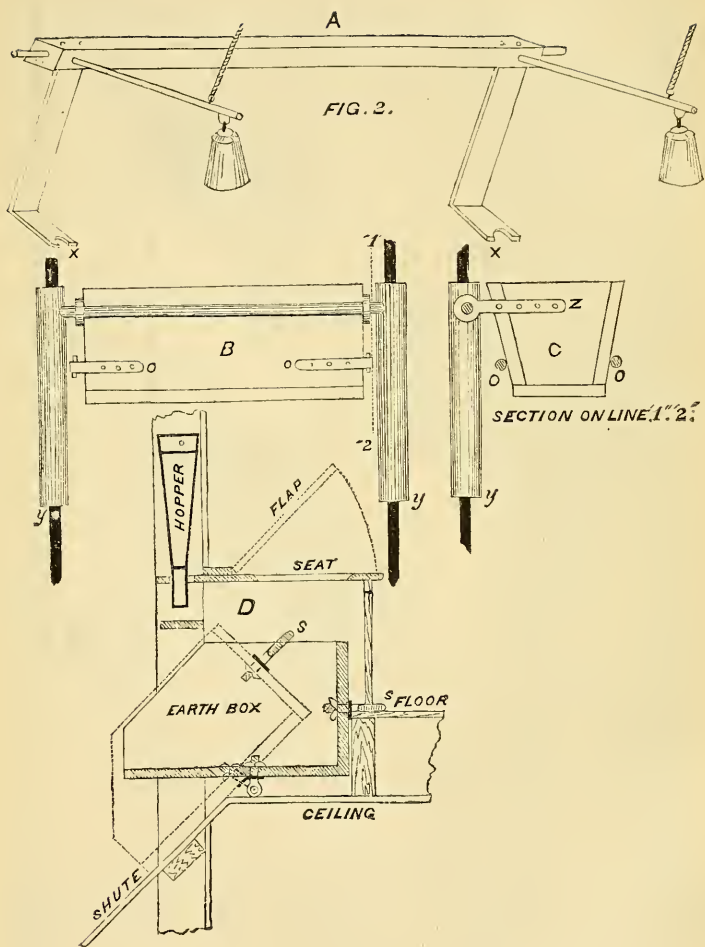
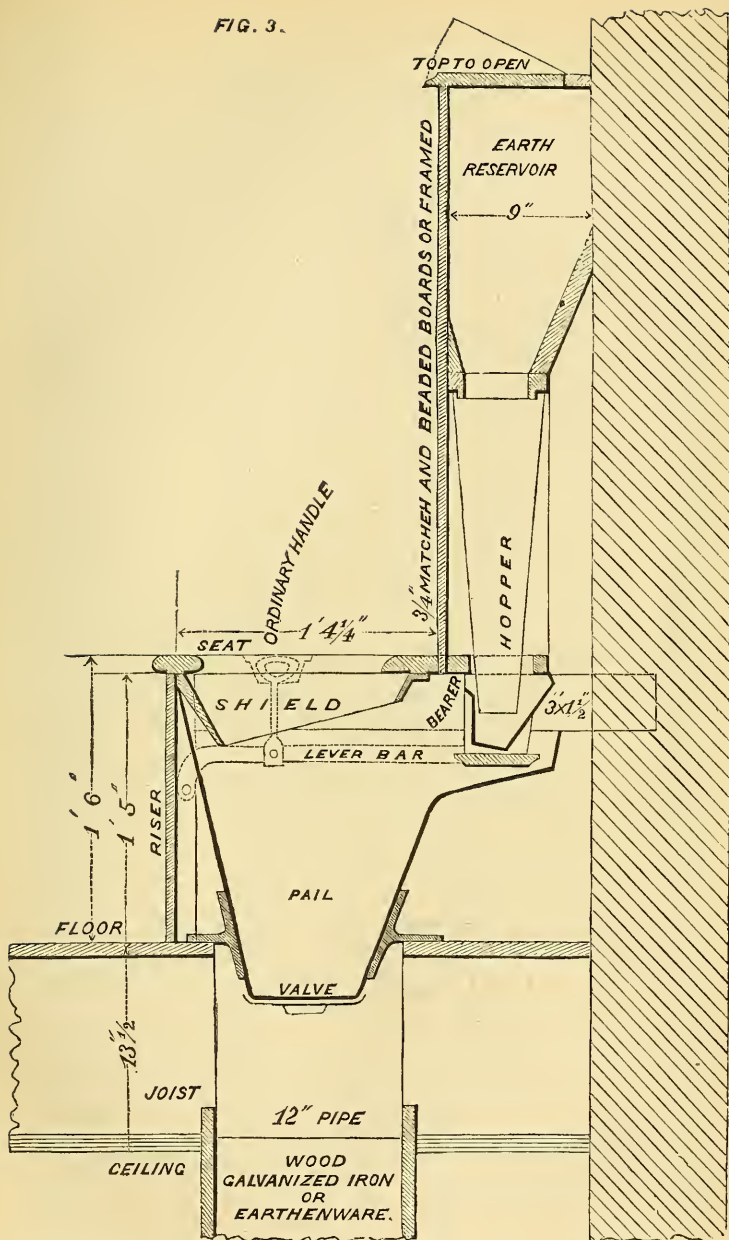
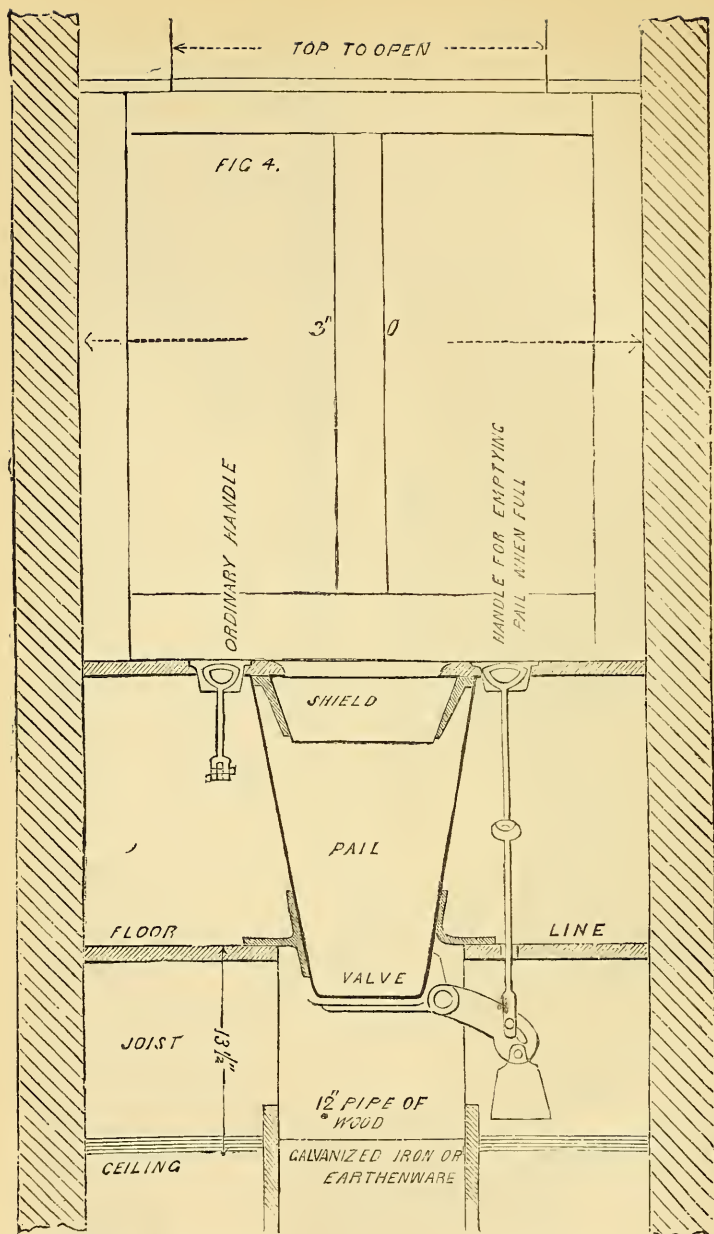


FIG. 3.

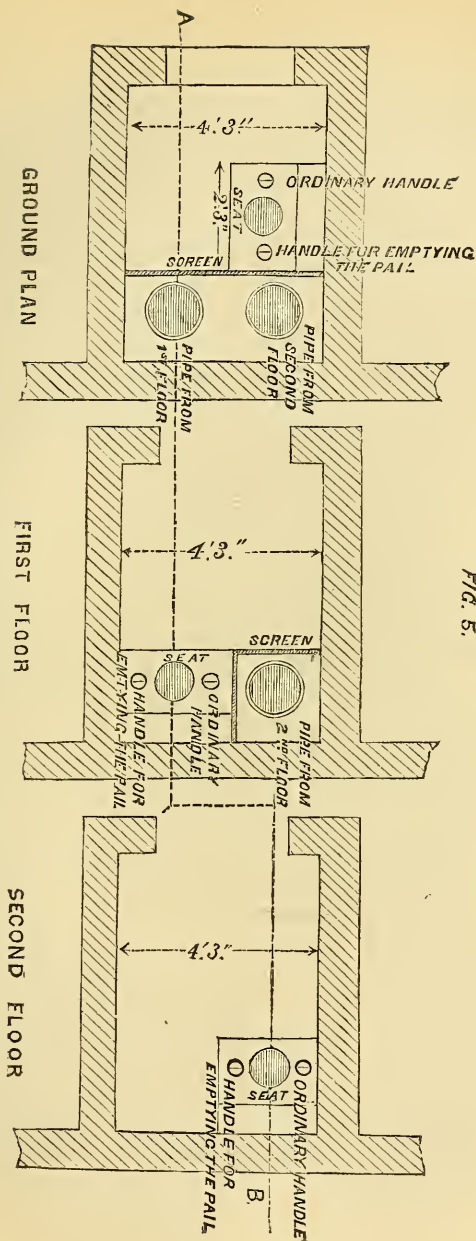


APPARATUS FOR UP-STAIRS CLOSET, WITH VALVED PAIL.



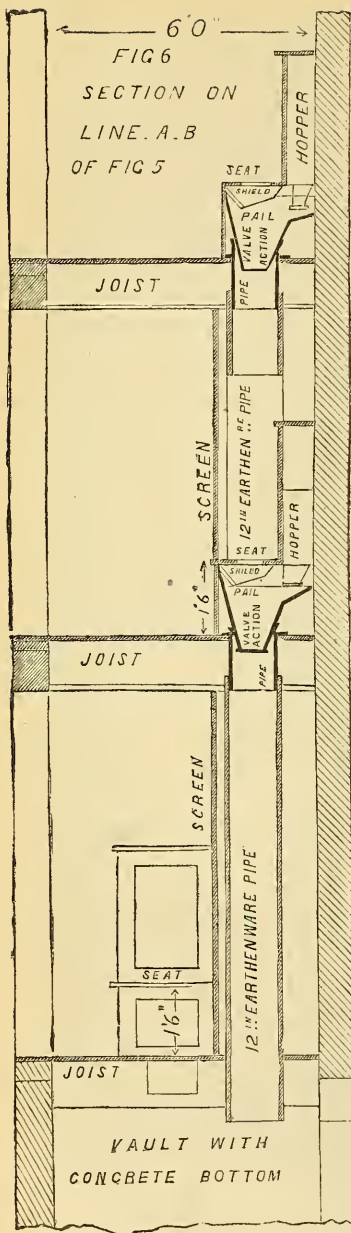
APPARATUS FOR UP-STAIRS CLOSET, WITH VALVED PAIL.

FIG. 5.



PLAN OF CLOSETS ON THREE FLOORS.

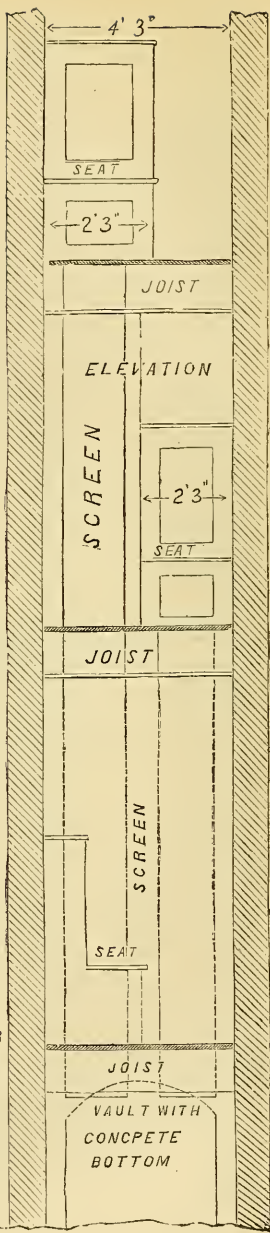
ELEVATION AND SECTION SHOWN IN FIG. 6

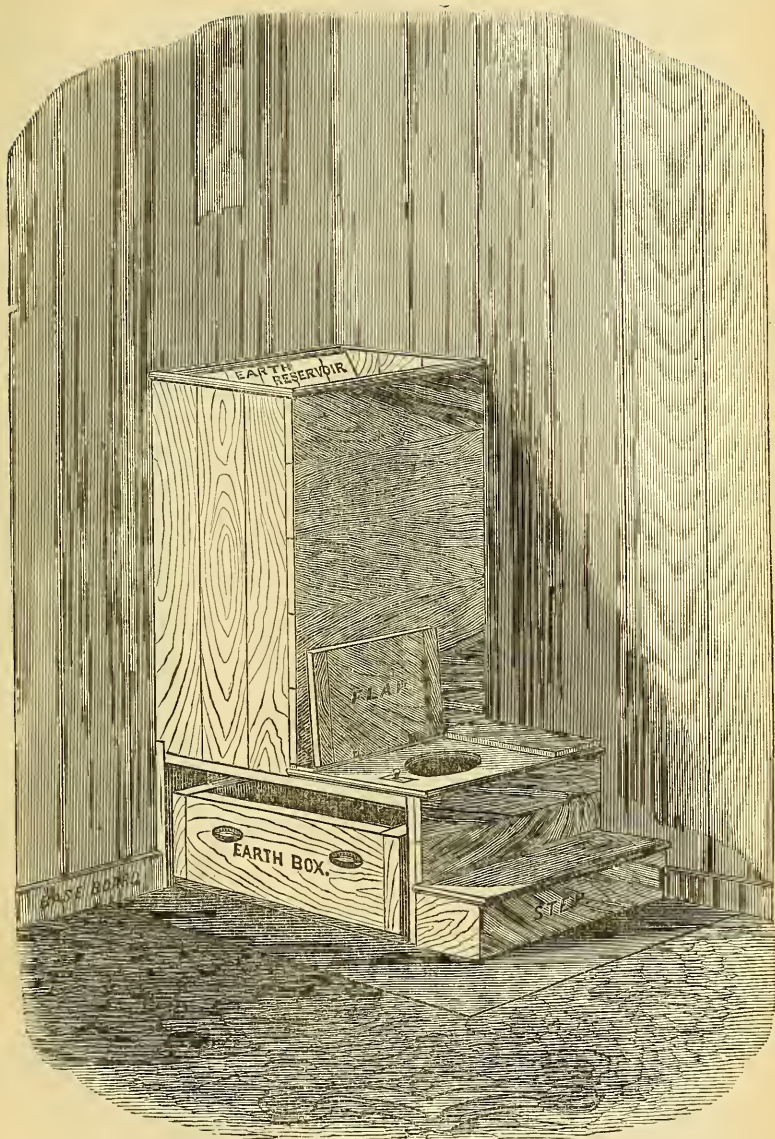


2ND FLOOR

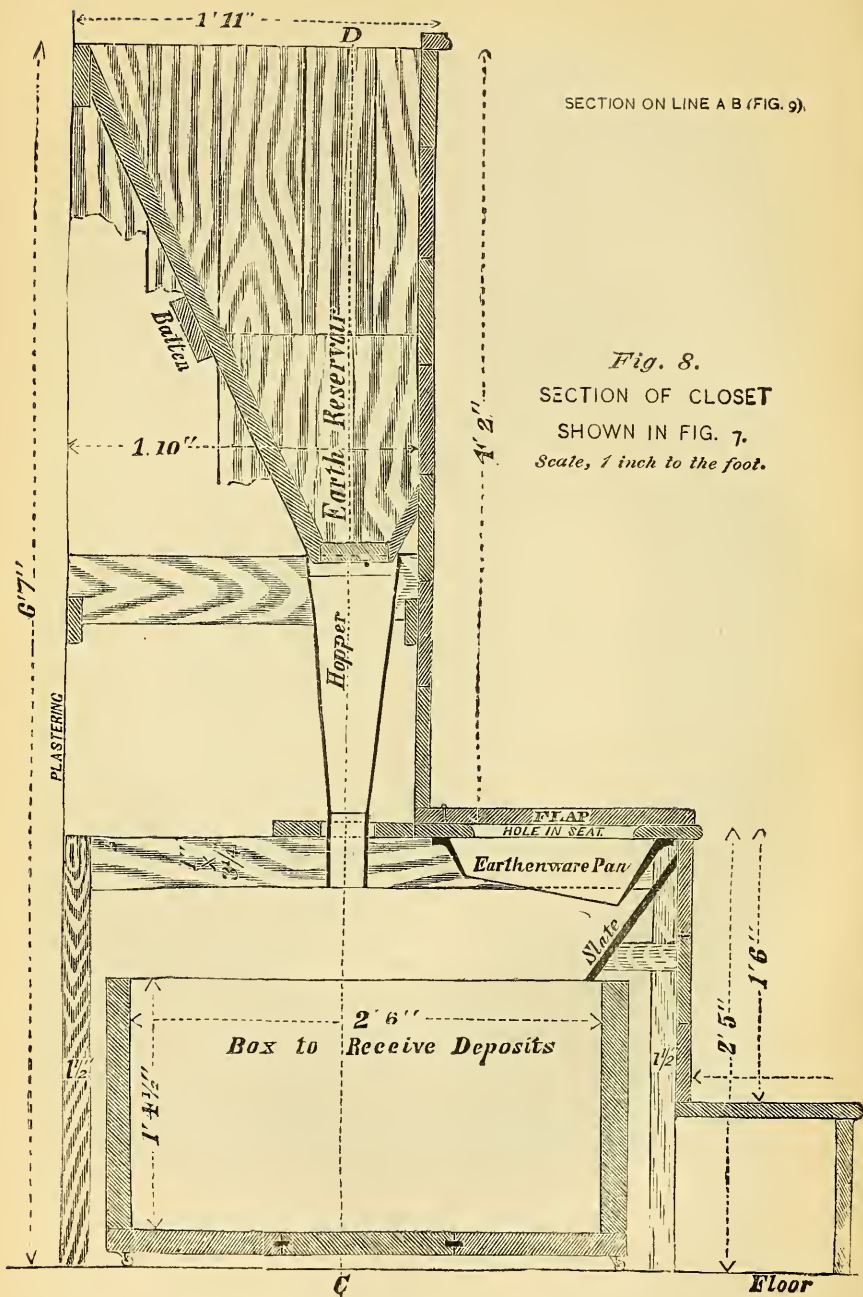
1ST FLOOR

GROUND FLOOR





CLOSET IN CORNER OF ROOM.



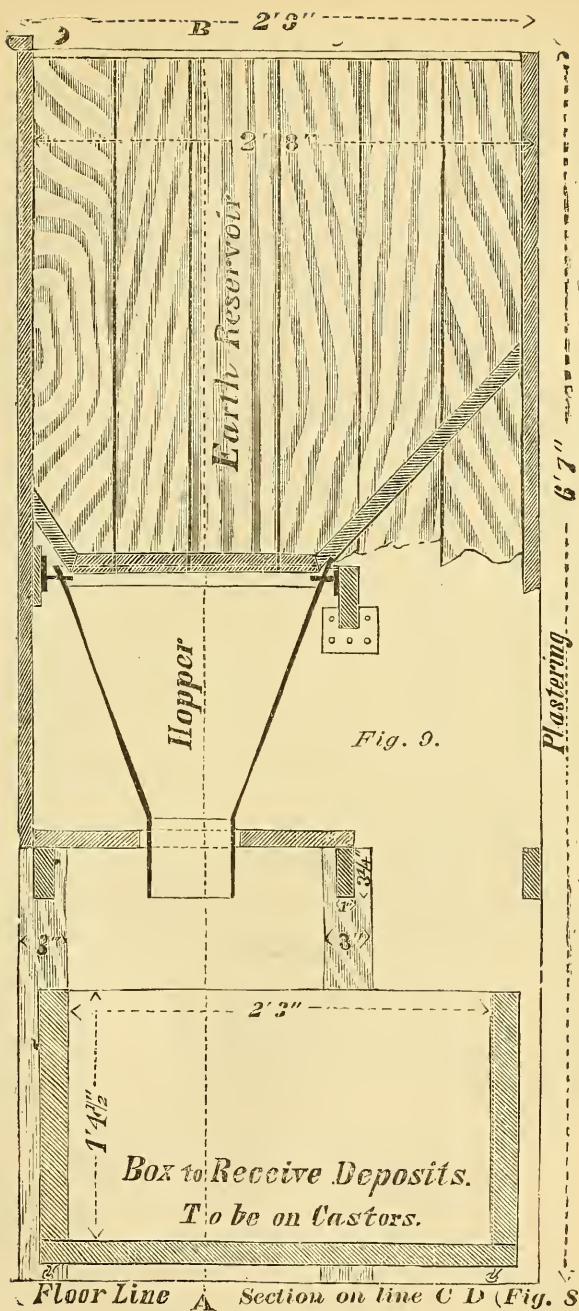
SECTION ON LINE A B (FIG. 9).

Fig. 8.

SECTION OF CLOSET

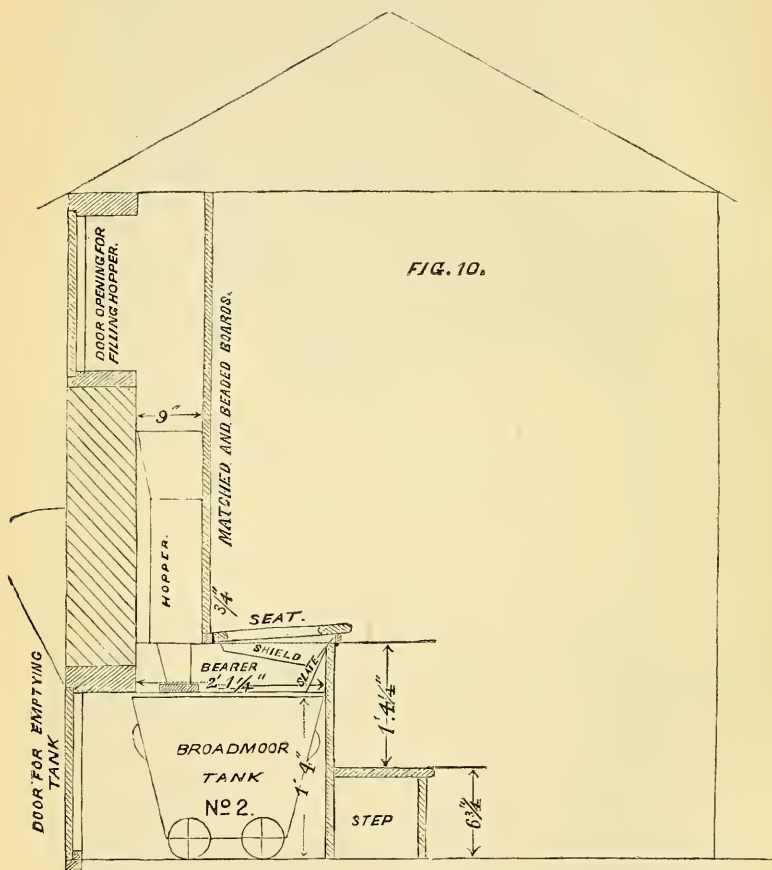
SHOWN IN FIG. 7.

Scale, 1 inch to the foot.

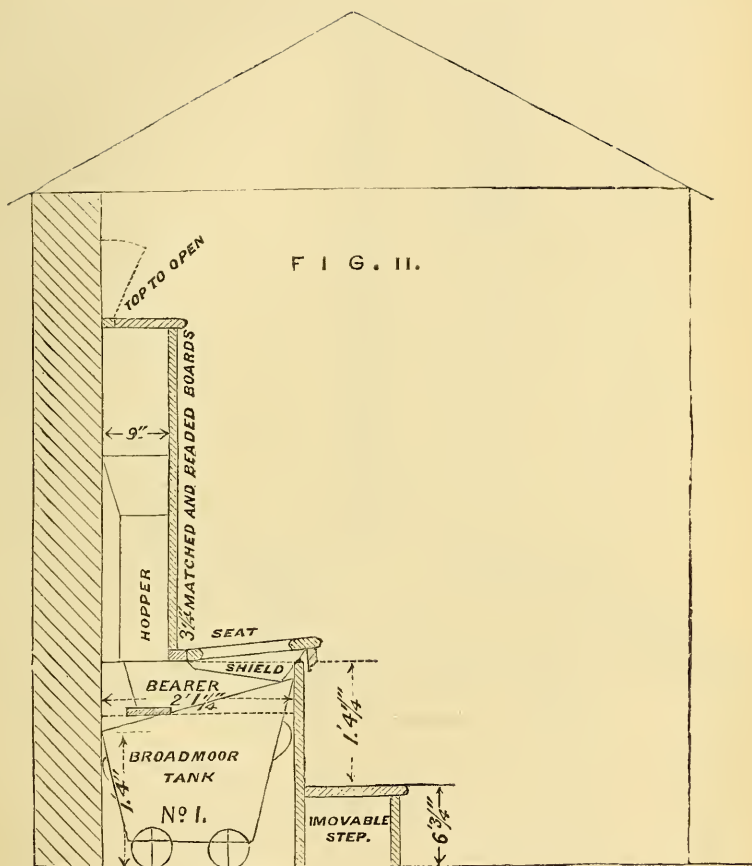


Floor Line A Section on line C D (Fig. 8).

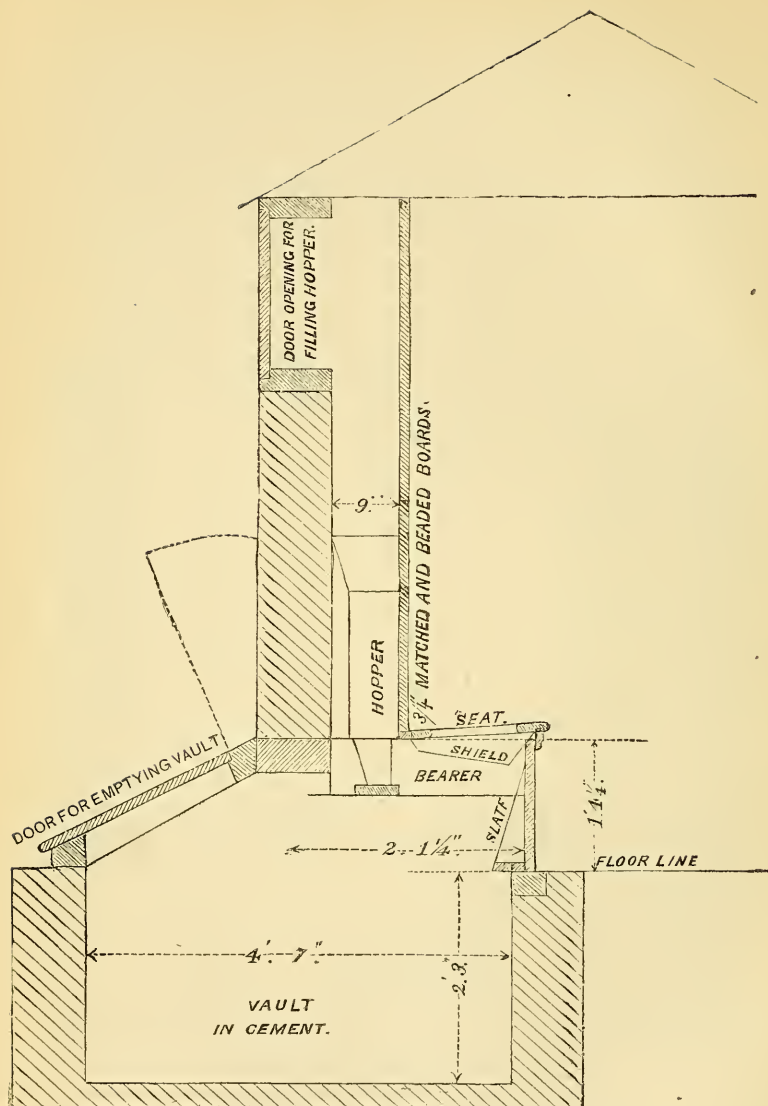
Section of Closet shown in Fig. 7.



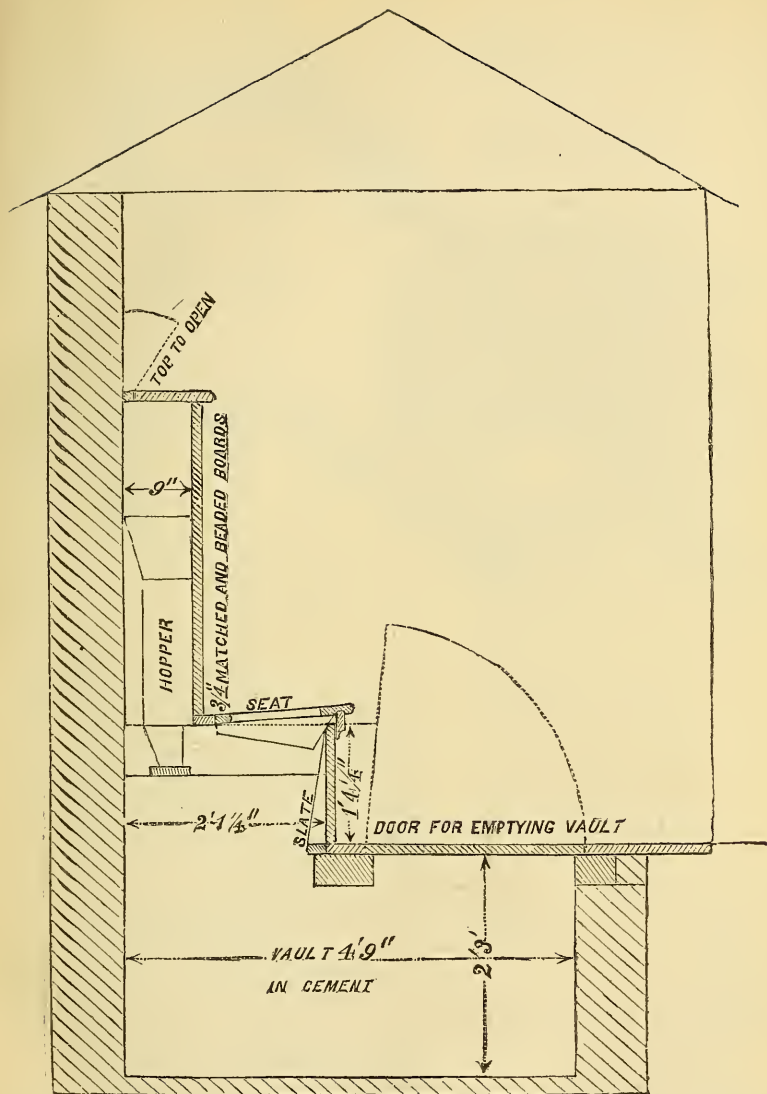
SECTION OF CLOSET WITH TANK,
TO BE SUPPLIED AND EMPTIED FROM THE REAR.



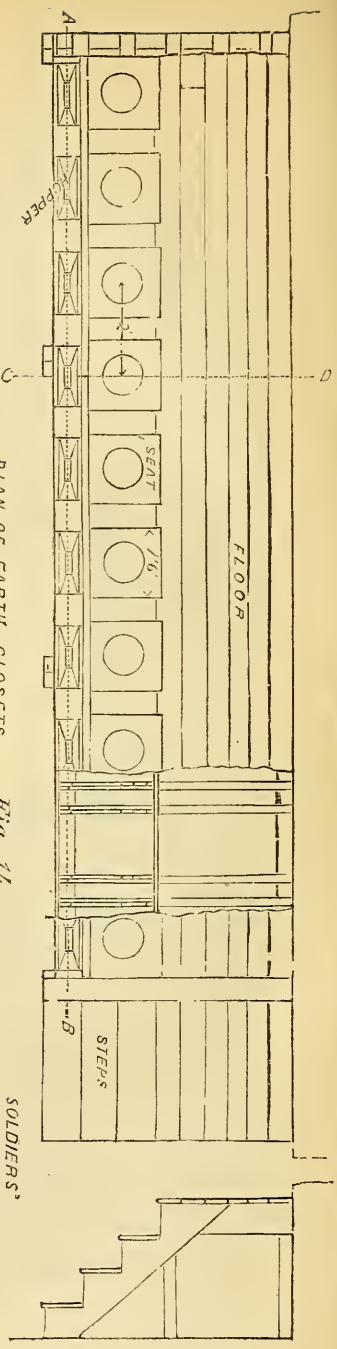
SECTION OF CLOSET WITH TANK,
TO BE SUPPLIED AND EMPTIED FROM THE INSIDE.



SECTION OF VAULTED PRIVY,
TO BE SUPPLIED AND EMPTIED FROM THE REAR.



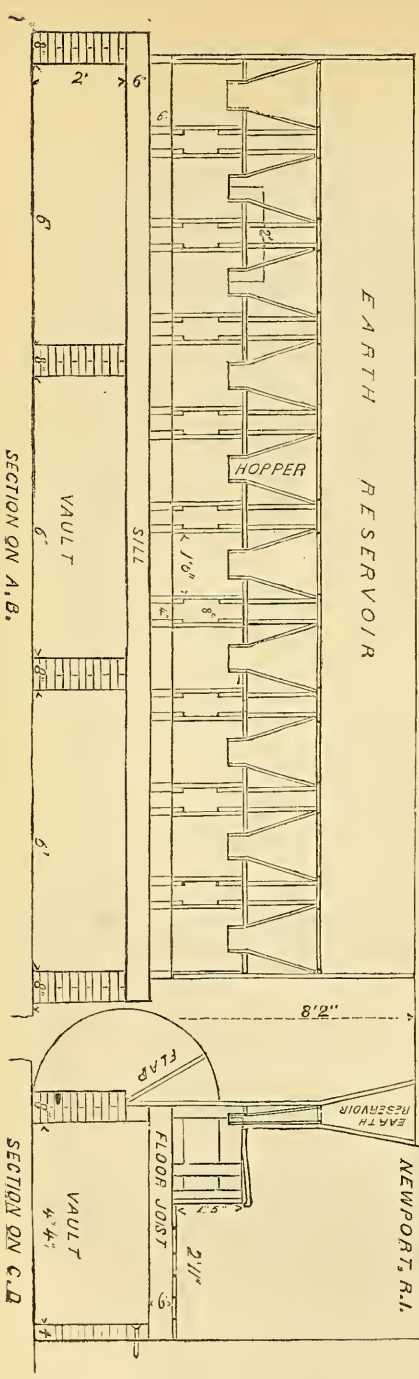
Section of Vaulted Privy showing Hopper filled and Vault emptied from Inside.



PLAN OF EARTH CLOSETS FIG. 14.

SOLDIERS' EARTH-CLOSETS

FORT ADAMS.
AT
NEWPORT, R.I.



SECTION ON A.B.

SECTION ON C.D.

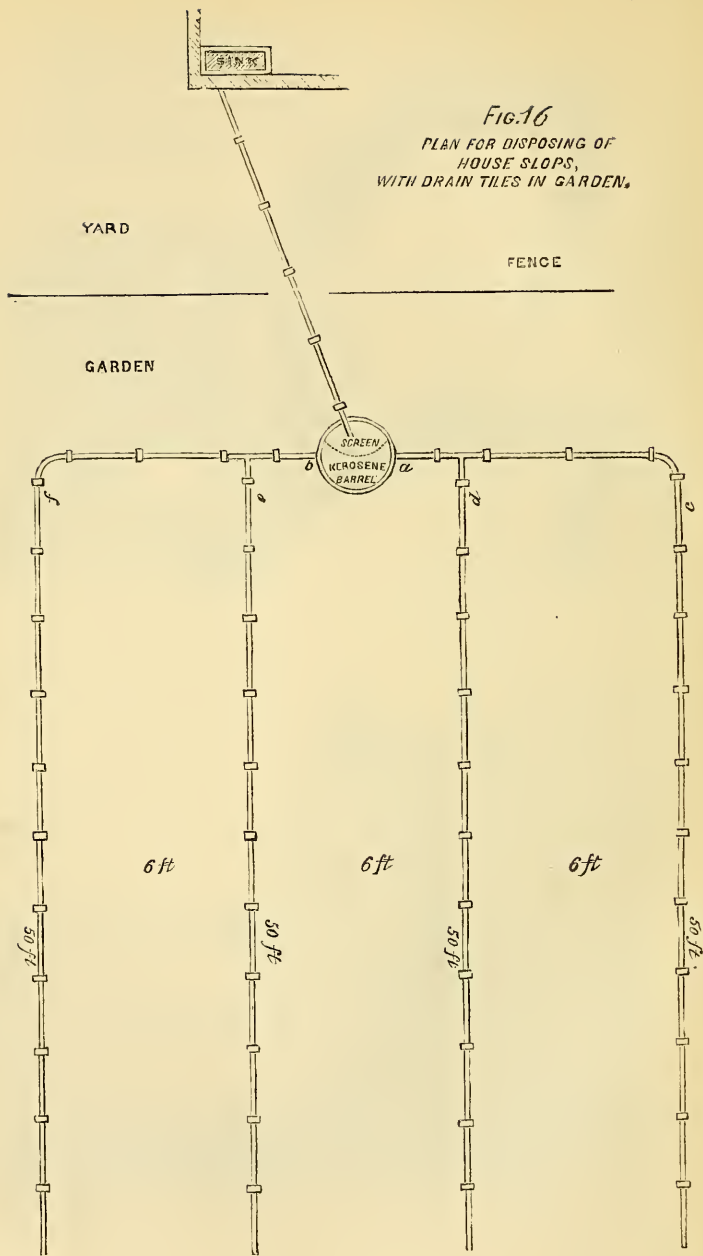


Fig. 16

PLAN FOR DISPOSING OF
HOUSE SLOPS,
WITH DRAIN TILES IN GARDEN.

THE PHILOSOPHY OF THE EARTH SYSTEM.

THE precise manner in which dry earth accomplishes the complete deodorization of human excreta, and positively prevents all noxious exhalations therefrom, has not been determined; and "new studies," says Professor Johnson, of Yale College, "are absolutely required before the subject can be intelligently discussed."


Professor J. F. Way, Chemist to the Royal Agricultural Society of England, attributes the effect to the double silicates of alumina and some other base that are found in all clays, and thus explains the action that takes place:

"I have avoided giving any detailed technical account of these salts, and have only mentioned those particulars in their history which bear upon the agricultural question. It is necessary, however, to notice some points in relation to them as a class. In the first place, it will have been observed that there is a regular order of decomposition between the silicates of each base and ordinary salts of other bases; thus, the soda silicate is decomposed by salts of either lime, potash or ammonia; the potash silicate, again, is decomposed in its turn by lime or ammonia; and, lastly, the lime compound by ammonia. The different bases may be arranged in the order in which they replace each other from the silicate as follows:

"Soda,
"Potash,
"Lime,
"Magnesia,
"Ammonia.

"That is to say, that from a silicate of alumina and any one of these bases the base will be dislodged by a salt of any of those under it in the list. Nitrate of potash, for instance, will turn out soda from its silicate, and a potash silicate will be formed; whilst ammonia will replace any of the other bases. Of course, the reverse of this action cannot occur, and, therefore, the double silicate of alumina and ammonia cannot be decomposed by any neutral salt of the other alkalies."

THE GAS NUISANCE.

F the supply of gaslight in our houses were measured by our knowledge of the process of gas manufacture, probably nineteen-twentieths of all the consumers would be compelled to go back to "the light of other days," or run the dangerous risks of an explosive kerosene. Even medical men pay but little attention to the subject, and may, therefore, be deemed excusable for an occasional display of ignorance.

In Wheeling, however, it might be supposed—judging from the *quality* and, above all, the *price* they pay for the luxury—that all classes of consumers knew something of the manufacture, as well as of its expensive value. In a word, I dare say that (the abundance and price of coal and all other things being considered) no people in America—if, indeed, in any other country—pay so dearly for poor, because impure, illuminating gas as do the people of the city of Wheeling. The charter fixes no standard of illuminating power, but it *does* say, *fortunately*, that not more (!) than \$3.50 shall be charged per thousand cubic feet, the last farthing of which sum is demanded and collected.

It is said that Pittsburgh furnishes the cheapest gas in the country, the price being \$1.85 per thousand feet. For that reason people there are not afraid to light their houses. The Gas Company furnishes to the city 12,500,000 feet annually without charge, and charges \$1 per thousand for what is used by the city over that amount. Cincinnati comes next in order, \$2.25; Cleveland, Ohio, and Milwaukee, Wis., pay \$2.50; Baltimore, Chicago, Providence, R. I., Richmond, Va., and Wilmington, Del., \$3; Detroit, \$2.30; New York, New Haven, Peoria and Rochester, \$3.50; Troy, N. Y., \$3.75; Charleston, S. C., Norfolk, Va., New Orleans, Springfield, Mass., and Wilmington, N. C., \$4.00; St. Louis, Mo., and New

berg, N. Y., \$4 50; Augusta, Ga., Atlanta, Ga., Knoxville, Tenn., Rome, Ga., and Savannah, Ga., \$5; Columbus, Ga., \$6.50. These rates are charged to private consumers.

The coal from which Baltimore gas is made goes from the Fairmont and Newberg mines, over the Baltimore and Ohio Railroad, a distance of nearly 300 miles, or from points within 112 miles of Wheeling. The Wheeling Gas Works are situated almost within a stone's throw of the mines from which they are supplied, and yet our people are compelled to pay fifty cents more per thousand feet than is charged in Baltimore, and get a gas of far less illuminating power.

There is no reason why Wheeling should not produce as *cheap* and *pure* gas as is manufactured in Pittsburgh. The people have long borne the unjust burden of \$3.50 per thousand cubic feet for a very impure quality of gas, and they now ask the City Council to put an end to the imposition by refusing to revive the present charter.

On this subject, the Wheeling "Daily Register," under date December 1, 1870, says:

"Considerable interest has been felt and manifested lately by many of our citizens in relation to the 'gas question,' whether or not the city should avail itself of the privilege afforded under the charter of the Wheeling Gas Company of buying the works and running them upon city account. The act incorporating the Wheeling Gas Company was passed by the General Assembly of Virginia, on the 18th of March, 1850, and provided that the company should have the exclusive privilege of furnishing gas to the citizens of Wheeling for the term of thirty years, from the time the company commenced the distribution and supply of gas. It also provided, however, that at the expiration of twenty years from the same time, the City of Wheeling should have the right, in the discretion of the councils, of purchasing the property of the company at its then actual value, without considering the franchises granted in the charter or the profits accruing to stockholders. The company commenced the supply of gas some time in January, 1851, consequently the twenty years expire in January, 1871, and the city has six months thereafter in which to consummate the purchase or decide to let the present company continue in the enjoyment of its present privilege.

"It will be seen by reference to the proceedings at the meeting of the City Councils last night, that a committee was appointed to confer with the directors of the gas company in reference to the matter, and make a report at a future meeting.

"There seems to be no doubt whatever that the gas supplied to the citizens of Wheeling is far below the standard of illuminating power required in other cities. In fact the charter of the company prescribes no standard whatever. The company is simply to furnish an 'inflammable gas' for the purpose of lighting the streets, &c., but what kind of inflammable gas or what its illuminating power must be, are not specified. The gas we have been using can be manufactured more cheaply while it measures just as much as gas of a higher illuminating power, and hence the Wheeling gas has generally been about one-fourth or one-third below the standard required in Pittsburgh and other cities.

"The price that is charged, also, \$3.50 per thousand cubic feet, is the extreme allowed by the charter, while the opinion of experts is that better gas could be furnished to our citizens at a cost not exceeding \$2.50 per thousand, and still leave a handsome margin of profit to stockholders.

"Whether the purchase of the works by the city and their operation by city officers (something after the manner of the water-works) will remedy the evils of which we complain—give us better gas at lower cost—remains to be considered. We trust that the committee appointed by the councils will give the matter careful investigation. The people of the city are deeply interested in the matter, and will scan very carefully the action of the councils in his regard."

THE MANUFACTURE OF GAS.

Illuminating gas is made from bituminous coal. This coal is composed of carbon and hydrogen, with some sulphur and nitrogen, and earthy silicious impurities which constitute the ash.

The hills about Wheeling afford a good quality of gas coal in great abundance, and the Gas Works are situated within a few hundred yards of the mines.

The manufacture of gas is conducted as follows: The retorts, which are made of iron or clay, are charged with coal and exposed to a high heat. The products of such exposure are coke, tar, ammoniacal liquor, and gas. The coke remains in the retort; the tar and ammoniacal liquor accumulate in the hydraulic main, and in the condenser and scrubber; the gas passes on to the purifiers. As it leaves the hydraulic main, the gas consists chiefly of marsh gas, carbonic oxide and hydrogen (which are non-illuminating combustible constituents) of olefiant gas, and several other hydro-carbon gases and vapors which are the illuminating constituents—sulphuretted hydrogen, carbonic acid, ammonia, cyanogen, sulpho-

cyanogen, bisulphide of carbon, aqueous vapors. This last group of eight constituents constitute the useless or injurious impurities. The objectional impurities which must be gotten rid of by a process of purification are : sulphuretted hydrogen, sulphide of ammonium, cyanide of ammonium, sulpho cyanide of ammonium, bi-sulphide of carbon, certain other sulphur compounds whose exact nature is not known, and carbonic acid.

Prof. Chas. F. Chandler, PH. D.,* chemist of the Board of Health of New York, and who also fills the chair of Analytical and Applied Chemistry in the School of Mines in Columbia College, after fourteen years' investigation of the subject of gas manufacture in all its details, both in this country and in Europe, and who, for these very good reasons, may be considered competent authority on any question relating thereto, says :

“The sulphur compounds are all very objectionable ; they give the gas a very offensive smell, and when burned produce sulphurous acid, which, if evolved in any considerable quantity, would quickly render the air of a room unfit for human life, and seriously injure furniture and goods exposed to its action. These sulphur compounds must, therefore, be removed. The carbonic acid is objectionable only in so far as it diminishes the illuminating power of the gas when present in appreciable quantities. There is no sanitary objection to carbonic acid ; for perfectly purified gas would produce, when burned, a great many times as much carbonic acid as exists in the most impure crude gas. The presence of ammonia in gas in appreciable quantities is objectionable ; but as all the methods of purification, at present used, remove the compounds of ammonia very effectually, we may confine the discussion to the sulphur compounds and the carbonic acid.”

There are four methods of purifying gas now in use : (1,) the wet lime process ; (2,) the dry lime process ; (3,) the Laming process, and (4) the iron-ore process.

1. THE WET LIME PROCESS involves passing the gas through milk of lime.

“It is the oldest process in use, and is very effective in removing both the sulphur compounds and carbonic acid. It has been generally abandoned, however, on account of the difficulty of disposing of the toul milk of lime, called “blue billy.” Occurring as a liquid, the “blue billy” is not easily transported ; and as it does not rapidly undergo oxidation, it is not well adapted for use

* Fourth Annual Report of the Metropolitan Board of Health, New York.

as a fertilizer. Running it into streams and rivers has been forbidden by law, as the pollution of the waters by it was intolerable, while the extremely offensive smell which it emits makes it impossible to store it until it becomes dry enough for transportation."

2. THE DRY LIME PROCESS consists of placing slightly moist hydrate of lime on trays in iron boxes, through which the gas is made to pass. This process is very effective, and has very generally superseded the wet lime process, where lime is at all used.

"It removes the sulphur compounds and the carbonic acid equally well. When the foul lime is removed, however, it evolves the same odor which caused the wet lime process to be abandoned. When exposed to the air it rapidly undergoes oxidation, becoming heated in consequence. During this process it evolves sulphide of ammonium and some other compounds whose exact nature is not known, but whose odor is extremely offensive. This is the cause of the 'gas nuisance' so loudly complained of a few years ago, when all the New York companies employed this process of purification. After the oxidation of the foul lime is completed it ceases to be specially offensive, the peculiar stench being evolved during the first hour or two of exposure. The offensiveness of this foul lime became such a constant cause of complaint in the large cities of Europe that the gas companies were compelled to abandon the process, as they had previously abandoned the wet lime."

A system has been invented of ventilating the foul lime, which effects its oxidation in such a manner that the offensive gases evolved are not permitted to escape into the atmosphere, but are passed through a washing apparatus, and finally through a special purifier, by which they are rendered comparatively inoffensive. This invention seems to obviate the nuisance of the dry lime purification, but, unfortunately, knowledge of it has not yet reached the Wheeling gas works, and the people are therefore compelled to endure the abominable stench of sulphuretted hydrogen and sulphide of ammonium, which are the offensive gases constantly evolved. In dry, clear weather, these foul odors rise rapidly in the air, and are then not so perceptibly offensive, but in damp, heavy weather, they are diffused throughout the central and eastern portions of the city. The works are situated on the bank of Wheeling creek, within the city limits, and when the *trays* are emptied upon the refuse lime pile, just across the street from the works, the atmosphere, in the neighborhood of the bridges which span this stream, is sometimes positively choking, and at all times more or less disagreeable and offensive.

(3) THE LAMING PROCESS, taking the name of its author, was introduced in France, in 1849. By this process the hydrated sesqui-oxide of iron is substituted for lime for purifying gas, "preparing it of a suitable quality, by mixing copperas (sulphate of iron) with slacked lime and sawdust, and exposing the mixture to the air, to oxidize the protoxide of iron to the sesqui-oxide." The resulting mixture contains hydrated sesqui-oxide of iron, sulphate of lime, and sawdust.

"When an excess of hydrate of lime is employed, the resulting mixture contains this substance also. This material is very effective in removing the sulphur compounds from the gas. There is, however, some difference of opinion as to the completeness with which the carbonic acid is removed, due, perhaps, to variations in the proportions of the ingredients. Two important advantages attend the use of this mixture; first, when fouled, it does not evolve offensive odors on exposure to air; second, by exposure to air, the sesqui-oxide of iron, which has been changed to sulphide of iron in the purifier, is regenerated, the sulphur being liberated, and sesqui-oxide of iron again formed. The mixture may, therefore, be used again and again, till it becomes so clogged with the sulphur liberated that it does not act promptly on the gas. It is then found to contain from forty to sixty per cent. of sulphur, and may be used for the manufacture of sulphuric acid. I have seen mixtures that had been in use twelve months."

(4.) THE IRON ORE PROCESS, introduced by Mr. J. F. Hills, consists in the use of the natural hydrated sesqui-oxide of iron, or "bog-iron ore." "This material, like the Laming mixture, may be used again and again, and does not evolve offensive odors when exposed to the air." A modification of this process is now used by the New York Gas Light Company, in the City of New York. It was invented by Messrs. St. John and Cartwright, and has been in use nearly two years, giving entire satisfaction. As the bog-iron ores in the vicinity of New York are not sufficiently pulverulent to act promptly on the gas, a quantity of iron borings and turnings are added to the ore, which they then convert into an artificial hydrated sesqui-oxide of iron, by moistening the whole with ammoniacal liquor and exposing it to the air. "The resulting mixture of natural and artificial oxide receives an addition of coarsely-pulverized charcoal. This mixture is always sprinkled with ammoniacal water before it is placed in the purifier."

"The material now in daily use at the works of the New York

Gas Light Company was introduced in April, 1868. Occasional additions of iron borings have been made to it; otherwise, the material is the same. When last tested, it contained thirty per cent. of sulphur. In Germany, several varieties of sesqui-oxide of iron are now in use, prominent among which are 'the Oberuseler mixture,' an iron ore containing some oxide of manganese; the 'Manheim oxide,' and 'Deicke's oxide,' very pure oxides of iron."

EXTENT TO WHICH THE DIFFERENT METHODS ARE EMPLOYED.

"*The Wet Lime* method," continues Professor Chandler, "has been almost entirely abandoned. The only works at which I know it to be used at present are at Cork, in Ireland. These works are of moderate size, and are situated out of the city. Moreover, the gas is freed from ammonia, by means of sulphuric acid, before it comes in contact with the lime. The foul lime does not, therefore, evolve sulphide of ammonium when exposed to the air."

The Dry Lime process—the method employed in Wheeling, and generally used in this country, *has been almost universally abandoned in Europe*. "Abandoned, firstly, because the foul lime was an *intolerable nuisance*; secondly, because the process is too expensive, as the lime can be used but once, and when exhausted has but a trifling value as a fertilizer."

"*The Laming mixture* is now used in many of the European gas works. All the gas supplied to Paris is purified by this material. The German gas engineers have found that this mixture owes its efficiency entirely to the oxide of iron which it contains, and that the sulphate and hydrate of lime present do not take any appreciable part in the purification. Hence, they are abandoning this mixture for the natural or artificial oxides of iron, which are cheaper and more efficient."

The Iron Ore method of purification is now most generally used in Europe, and has already been adopted by several companies in this country—the New York Gas Light Company taking the lead in this line of progress. The Manhattan Company, of New York, still holds on to the dry lime process, but it has been compelled to employ the *ventilating* system, already described, to obviate the nuisance of dry lime purification.

"All the Liverpool, much, if not all, of the London gas, and that of most of the German cities, is now purified either by iron, or one of the artificial oxides of iron."

Dr. Schilling, director of the gas works at Munich, and editor

of the *Journal für Gas beleuchtung*, says, on page 247 of that journal for 1868: "Iron purification is now in general use."

Mr. A. Buhe, who was one of the chemists employed by the German Gas Association to invest the whole subject of gas purification, says, in the above-mentioned journal for 1868, page 327, *et sequitur*: "Gas engineers have sought, by various means, especially by lime, to remove the carbonic acid from gas, but these have been generally abandoned on account of the cost and the numerous disadvantages which attend their use. * * * Purification by lime is hardly in use at the present time."

Mr. G. R. Hislop, engineer and manager of the Paisley Gas Works, and President of the North British Association of Gas Managers, said in his address at Glasgow, July 28, 1869: "Purification by lime in London and elsewhere has now become inadmissible; in such places, oxide of iron is employed as the purifying agent."

Professor J. Lawrence Smith, one of the United States Commissioners to the French Exposition, in 1867, who is the President of the Louisville Gas Company, speaks very positively on this subject. On page 88 of his report, which was published by the United States Government, he says of the Paris gas—purified by the Laming process:

"The gas of these works is most thoroughly purified, and the dealers in silks and other delicate fabrics who, a few years ago, always suffered more or less loss from the results of the combustion of impure gas acting on their fabrics, now no longer suffer from this cause."

He further states that "*the oxide of iron process is generally used in all the cities of Europe.*" These words of Professor Smith I have italicized, hoping thereby that they may the more surely attract the attention they deserve of Wheeling readers.

✂He further states that "*the oxide-of-iron process is generally used in all the cities of Europe.*"

Professor Benjamin Silliman, who is in favor of the dry lime process, when along with it the new method of ventilation is employed, as adopted at the Manhattan Works, in the City of New York, says that "in London and on the Continent, the usual process employed is the iron process."

And further, he says: "I can conceive that in every Metropolitan Gas Works it is the bounden duty of the company to exercise all possible diligence to avoid the nuisances which are sure to manifest themselves."

"So great is the nuisance," says Knapp, in his *Technology*, vol.

1, at page 610 of the London edition, 1855, "produced by the effluvia from gas lime, that numerous plans have been at different times suggested for its prevention."

Samuel Clegg, in his work on the Manufacture of Coal Gas, fifth London edition, page 187, says:

"It is to the prevention of this evolution of sulphuretted hydrogen that the process of purification by oxide of iron owes its chief recommendation; for the affinity of oxide of iron for sulphuretted hydrogen is greater than for carbonic acid. Hence, the sulphuret of iron, when removed from the purifier and exposed to the air, emits no odor; while the sulphuret of lime is readily decomposed, and produces an abominable smell."

Muspratt, in speaking of the material used in purifying gas, (German edition of his work, vol. iii, page 1522,) says: "Of all these materials, Laming's mixture and the iron-ore have obtained the most general or prominent introduction. Laming's mixture has, above all others, particularly lime, essential advantages. After being once used, it can be regenerated and used again. According to Unruh's experiment in Magdeburg, the purification of sulphuretted hydrogen takes place so completely that one cannot detect the smallest trace of the most delicate reagents, and the quantity of carbonic acid in the gas is extremely small—the illuminating power not less than when lime is employed, and the smell of the foul mass trifling." Concerning the "purification of iron ore," the same author says, in the same volume, page 1523: "This ore is often cheaper, or more easily obtained than Laming's mixture, and is regenerated at first slower, and afterwards more rapidly. At the new city gas works in Berlin, the ore obtained in Upper Silesia is employed. In the gas works at Hanover, the fine pulverized ore of Lunenberg, mixed with spent tan and refuse dye-wood, is employed."

In his Chemical Technology, page 699, Wagner says: "Much more important than all the previous methods of purification, and really establishing an era, is the process of R. Laming in 1849."

Bloxam, in his Chemistry, at page 450, referring to Laming's process, says:

"A great many other methods have been devised for the purification of gas from sulphuretted hydrogen, but none appear to be so efficacious and economical as that which consists in passing the gas over a mixture of sulphate of iron (green vitriol or copperas) slacked lime and sawdust, which latter is employed to prevent the

other materials from caking together. The lime decomposes the sulphate of iron, forming the sulphate of lime and hydrated oxide of iron."

In Bowditch's work on "The Use of Coal Gas," London edition 1867, at pages 19, 20 and 21, may be found the following statements :

"About this date ('1844') the use of gas was increasing very rapidly, the gas companies in London and in some of the large towns were sadly encumbered and troubled about the lime refuse which arose from this gas. Purified, the gas must be. Sanitary regulations most properly prevented the running of *blue billy*, wet lime refuse, into streams and rivers, and in some cases prohibited the casting away from gas works of dry lime refuse during the day time. Matters seemed to be approaching a crisis when, in 1849, Mr. Hills came to the rescue and introduced hydraous sesquioxide of iron as a purifying agent instead of lime. * * *

"When a certain quantity of sulphur has been set free in a mass of oxide of iron it becomes useless, not because its chemical affinity for sulphuretted hydrogen is destroyed or even lessened, or because the ore has lost the power to restore it when it is foul, but because it is clogged with inert sulphur. Mr. Hills further showed that when thus useless as a purifying agent, the oxide yet had a value, for the accumulated sulphur could be converted into sulphuric acid, and for this purpose the oxide was worth what it cost at first, and in some cases, I believe, even more. This was an enormous boon to urban gas companies. It delivered them from a great difficulty in reference to the foul lime, and taught them how to free their gas from sulphuretted hydrogen, without any cost for material to do so."

In his Manual of Elementary Chemistry, London edition, edited by H. Bence Jones and Henry Watts, at page, 180, Professor George Fowns, late Professor of Practical Chemistry in University College, London, says: "The use of lime, however, has been almost superseded by that of a mixture of sawdust and iron oxide."

Professor E. D. Mapother, in his lecture upon "Public Health," Dublin edition of 1867, at pages 53, 54 and 55, says :

"In both the gas works the mode of purification had been by the wet lime process, and the resulting refuse was conveyed into open tanks for the purpose of allowing the undissolved lime to settle from it. * * * * * All condemned the lime process, and approved of the iron process, except one eminent chemist, who stated that with proper precaution the wet lime process need not be a nuisance - injurious to health. I also consulted several

eminent gas engineers, and quoted authorities such as 'Muspratt's Chemistry,' 'Barlow's Chemistry of Gas Lighting,' 'Hughes's Treatise on Gas Works,' and thus produced much evidence upon the noxious character of the wet lime process in a populous town. In order to determine the matter by personal inquiry, the corporation commissioned me to examine the works in London and other English towns, during October, 1860, and I accordingly visited the London, City of London, Phoenix, Equitable Chartered, Imperial, York, and Scarboro Works, and ascertained that in all the lime process had been found to produce a nuisance, and that, therefore, the *oxide-of-iron* process had been substituted."

The objections urged against the iron methods of purification by those who are prejudiced in favor of lime are, first, they do not remove carbonic acid; and, second, that they do not remove the sulphur compounds as completely as lime.

"The first," says Professor Chandler, "is generally conceded to be true;" but the difficulty can be effectually met by taking less gas from the coal. It is well known that "the last gas drawn from the coal is always inferior to that which comes first." "It has become more and more the custom," says Mr. A. Buhe, one of the chemists of the German Gas Association, "to leave the carbonic acid in the gas, and to neutralize its bad influence on the illuminating power by taking less gas from the coal, thus getting a better gas." Dr. Schilling says: "Carbonic acid is of no consequence to the consumer; cannel coal is the remedy."

Concerning the alleged imperfect removal of the sulphur compound, it may be said truthfully that none of the methods of purification now in use completely remove the sulphur from the gas. The question, therefore, has been, how much sulphur can be safely left in the gas? The English Parliament has fixed the limit at twenty grains of sulphur and five grains of ammonia to 100 cubic feet of gas; and, to secure the consumers against fraud, chemical experts are appointed by Government to analyze the gas and report its quality.

London gas—all of which is purified by the iron process, by municipal requirement—does not average twenty grains of sulphur in 100 cubic feet. The degree of purity from sulphur compounds of Paris gas, has already been shown by Prof. J. Lawrence Smith's testimony, recorded on a previous page.

Concerning the greater economy of the iron-ore process, Mr. King, the engineer of the Liverpool works, asserts that he has used

the oxide of iron purification exclusively for the past seven or eight years, at a cost of less than half as much as the dry lime process, used previously.

These remarks have been extended to their present length in view of the probable early transfer of the Wheeling Gas Works to city control, when a most favorable opportunity shall be presented for making the necessary changes for purification by the *iron ore process*.

The introduction of the iron process would not require over five hours' labor to make the requisite changes, and the cost would not be worth calculating. And yet by this little labor the works would be "converted into a bed of roses," to what they are at present, from the constant evolution of a horrible stench, which not only sickens the neighborhood, but at particular hours the smell pervades the city with every direction of the wind.

The greatest change that could be necessary would consist simply in taking out the movable trays and introducing a flooring of plank, perforated with auger holes, all of which could be accomplished without serious interruption of the supply of gas.

To introduce the ventilating process, and continue the use of dry lime as the purifier, would require considerable additions to the apparatus—a suitable engine, a blower, a washer, and a supplementary purifier for the air used in ventilating, etc.—which would require an outlay of several thousand dollars and several months' labor to put the establishment in complete order.

DANGEROUS KEROSENE.



THIS subject deserves the most serious consideration of Health Officers, Boards of Health, and Legislators—State and Municipal—because of the frightful burning accidents constantly occurring from the use of impure burning oil, called “Non-explosive,” “Safety Oils,” and by other attractive names, some of which brands contain almost as much benzine as kerosene, and are thrown upon the market, regardless of the terrible consequences which occur from frequent explosions.

Native petroleum is a mixture of a great number of hydro-carbons, compounds of hydrogen and carbon. As it comes from the wells, it is generally of a dark yellowish, or greenish brown color, and possesses a peculiar and more or less offensive odor.

There are two extensive refineries in Wheeling, which are supplied, I believe, almost entirely from West Virginia wells. Even in wells of the same neighborhood, or district of country, there is very great difference in the quality of the petroleum produced; some containing large proportions of light benzine and naphtha, while others are heavy and thick, and suitable for lubricating machinery.

It is refined by distillation, by which process “the most volatile constituents pass off first, in the form of vapor, and are condensed, by passing through a coil of iron pipe surrounded by cold water, and collected as benzine, keroseline, gasoline, or naphtha. Subsequently, the burning oil or kerosene makes its appearance. This is followed by a heavier oil, containing parafin, and there is finally a small residue of tar or coke left in the still.

“That portion of the product which is designed for illuminating oil is then subjected to the action of sulphuric acid, to remove the odor and color, and destroy a little tar which it still contains.”

Such is the process of purification usually employed; but the careful refiner will still subject the fluid to a more elevated temperature, to expel a small percentage of benzine which it contains. Indeed, he can, if he will, make it truly *non-explosive*, and as safe in the household as that much water, and with only a few cents additional expense per gallon to the consumer. But competition, worthy or unworthy—not to mention the cupidity of the refiner—is irresistible; and if the price is below the cost of manufacture, adulteration must follow, and oils charged with benzine, etc., are thrown upon the market.

During the late civil war, when turpentine was very scarce, and commanded a high price, benzine was much used in its stead in many of the arts, especially in the mixing of paints and varnishes; then, benzine being worth more per gallon than kerosene, it was carefully extracted in the process of purification, and, consequently, very few accidents from lamp explosions occurred; but now, when there is no demand for benzine, and it has no value whatever, not so much care is taken to separate it, and hence the alarming frequency of kerosene explosions, and the heart-rending accidents resulting therefrom, which, every few days, are chronicled in the newspapers throughout the country.

During the last summer, I collected several specimens of kerosene sold in the Wheeling market, and carefully tested them—using the *open tester*, or Tagliabue's Instrument, and found them all to evolve an inflammable vapor below 100° Fahr. One of these specimens *flashed* at 92° , and burned at 108° Fahr. Another specimen, from a neighboring city, purchased in the quantity of fifty barrels, flashed at 72° Fahr., and burned at 84° Fahr. A keg of gunpowder would be safer in a family as a chimney corner stool and convenience, than such oil, because it is so volatile that *it seeks* the flame to accomplish its mission of horrid death!

About the same time, I obtained several specimens of really *safe* oil—so safe that it could not be sold at the ruling market price—from Messrs. Ford, Dodson, and Burt, and tested by the same apparatus, No. 1 *flashed* at 110° ; No. 2 at 115° ; No. 3 at 120° ; No. 4 135° Fahr.

The kerosene manufactured to order for the use of the machinery department of the Baltimore and Ohio Railroad Company, in Wheeling, for engine head-lights, for the shops—indeed, for all

branches of the service where gas cannot be used—the ordinary standard is a flashing test of 120° Fahr.; and each barrel of the fluid is carefully tested by Captain Harrison, the accomplished Superintendent, before it is suffered to be used.

What a wise and humane protection, if such care were exercised by State and municipal enactment, to secure all classes of people against coal oil accidents, who are compelled to use this cheap and beautiful light! Its safety is merely a question of a few cents more or less per gallon, and who would hesitate to pay five, ten, or fifteen cents per gallon for the difference between an oil which is perfectly safe, and one which, as Professor Chandler says, “is liable to destroy one’s wife and children at any moment by a horrid death?”

Most of the States have passed laws regulating the sale of kerosene oil—some of them sufficiently stringent; others, give no protection whatever. Two or three bills have been introduced into Congress, but it has been decided that it is a matter which can best be taken care of by State and municipal intervention.

In West Virginia, there is no legislative protection against dangerous kerosene, notwithstanding the vast number of accidents that have occurred from its use. Legislation, therefore, is badly needed, and it is sincerely to be hoped that the Legislature, now in session, will pass a general law on the subject, giving us the fullest protection.

An ordinance to regulate the sale of kerosene in the City of Wheeling, was presented to the Committee on Ordinances a few months since, but no action concerning its adoption has yet been taken by Council. Its protective features are almost an exact copy of the New York City ordinance—that is, a *flashing* test of 100° , and a *burning* test of 110° Fahr.

The really important test is the *flashing test*, and should be relied upon in testing oils. The English law relies entirely upon the flashing point, which is fixed at 100° Fahr. Two or three per cent. of naphtha may make an oil so highly dangerous that it will flash below 100° Fahr., and yet it will not burn under 110° Fahr. Let the *flashing test* be fixed by law at 110° Fahr., and kerosene explosions will scarcely be heard of—never, I am sure, from ordinary handling.

Of 636 specimens of kerosene oil found in the New York market, and tested by Professor Chandler, Chemist of the Board of

Health, in 1869, there were found dangerous oils, flashing below 100° Fahr., 280; highly dangerous oils, below both standard tests, 306; naphtha, etc., sold as "safety oils," 29; safe oils, according to both tests, 21! Total unsafe oils, 615.

During the year ending October, 1869, total fires in New York 913; fires caused by kerosene 98; equal to 17 per cent. Damage to property by kerosene fires, \$72,720. In Brooklyn during the same period total fires, 311; fires caused by kerosene, 31—equivalent to 10 per cent. During same year, deaths from kerosene accidents, 52; serious injuries, 50; slight injuries, 6; total, 108. One notable feature of these accidents is the fact that the victims are generally women and children.

In Wheeling during the past year, several serious accidents have occurred from explosions of kerosene lamps, three deaths from this cause having been reported.

HOW TO TEST KEROSENE.

The operation of testing kerosene is very simple to those who have been properly instructed in the matter. It is merely ascertaining the degree of temperature at which the oil will explode and burn—in other words, the *flashing point* and the *burning point*; but it should be remembered that even in the most skillful hands a margin of four or five degrees should be allowed. In ignorant or inexperienced hands a mistake of twenty or thirty degrees may be made. Hence the importance of a qualified inspector.

The best apparatus, perhaps, is the *open tester* of Tagliabue's, which costs \$12 or \$14. The oil is heated very slowly by a small flame from a spirit lamp, and the operation of testing should never be completed in less than fifteen minutes.

"When the oil flashes or burns but a few degrees from the standard temperature, it is hardly safe to spend less than twenty-five to forty minutes in raising the temperature to the flashing point."

"The thermometer should not descend far below the surface of the oil; if the bulb is well covered, it is sufficient. There is often a difference of a number of degrees in the temperature of the oil at different depths. It is well, therefore, to stir the oil before applying the flame."

To detect the flashing and burning points, a lighted match is passed across the cup, back and forth, almost touching the oil.

SLAUGHTER HOUSES, ETC.



TO search out the origin of foul and particularly of *putrid* odors, and, when it is possible, to see that the proper means are employed for their prevention, is a very important duty, and sometimes becomes one of the most difficult and perplexing problems connected with sanitary science.

Every city must needs have its quantum of offensive trades and manufactures, which grow in number and extent with its growth, and as a natural corollary, they are too often found situated (by right of long establishment, and at first occupying the suburbs) in the midst of a crowded and busy population, whose need leaves no room for nuisances, and they cannot exist without offense, and depriving somebody of the inherent right to enjoy pure air, the importance of which blessing in the economy of health has already been discussed in the chapter on Ventilation.

The village of Fulton, two miles distant from Wheeling, is the great slaughtering place for the city retail market; but there are several slaughter-houses along the border of East Wheeling, on the bank of the creek, which in warm weather become more or less offensive because of gross carelessness in their management, especially from the accumulations of putrid offal, which is sometimes allowed to lie in heaps until it can be devoured by the hogs, usually penned up near by, or it is entirely convenient to remove it to one or the other of the soap factories in the neighborhood.

As generally carried on, the process of butchering is exactly the same that it was a half century ago, when four or five beeves per week supplied the town—when there was no crowding of the population, nor thought of unwholesome influences. These nuisances have been the subject of frequent inspections, but it has been found impossible to adopt a standard that will render the

business of butchering (when carried on within the limits of the city) other than a very great nuisance.

Filthy butchering shops, "unused houses, open privies, pig pens, heaps of stable manure, may be suffered in the country, because their influence is modified by abundant ventilation; but in a crowded city, containing fifty or a hundred persons to the acre, they always increase the death-rate, and occasionally nourish a pestilence. The same considerations apply with equal force to the existing modes of slaughtering animals. * * *

"Great cities everywhere are discovering that the slaughtering of animals may become a prolific and dangerous source of filth. Paris discovered it under Napoleon the First, who applied the remedy. London was slow to reach the same conclusion, but has now followed the example of Paris. New York has recently become convinced that something should be done in the same direction, and the butchers themselves have entered upon the work of purification with zeal, and their complete success is already assured. St. Louis is now demanding a similar reform.

"The great source of offense in all these establishments consists in the manner of disposing of the parts of the animal used neither for food nor in the arts. In the ox these parts are the larger portion of the intestines and all of their contents, the 'omasum' or third stomach, the spleen, the lungs, and about half the blood. Every slaughter-house has a piggery, into which are thrown all these portions of the cattle and sheep. The result is a putrid mass, consisting of blood, which decomposes almost as soon as it falls upon such material—the excrement of the animals killed; and of the hogs, the half digested food contained in the entrails, and the offal itself covered with decomposed matter. In this filth the hogs, 'which yield *hams* and the most delightful *sausages*, wallow' and fatten for the table! 'At uncertain intervals it is scraped out and banked up on the ground * * * to await a purchaser, or is carted off to be spread upon land.' * * * 'The heads and feet are taken to the bone-boilers and glue-makers; the hides to the tanners.' " *

The foregoing description is a perfect picture of nineteen-twentieths of all the slaughter-houses in the country, and the subject, long overlooked, is now receiving the attention that it urgently demands. The following additional extract from the report of the State Board of Health of Massachusetts is worthy of not less attention :

"*The slaughter-house piggeries* are objectionable on the score of health—*first*, because they produce a questionable if not positively

* First Annual Report of the State Board of Health of Mass. on slaughtering for the Boston market.

unwholesome kind of pork; *second*, because they poison the air of their neighborhood.

"The pig is almost the only quadruped feeding in whole or in part on flesh which civilized man is willing to eat, unless pressed by starvation; among ourselves the only exceptions are the bear and the raccoon, and meat is not the chief food of either of these animals.

"The slaughter-house hog not only eats flesh, but flesh in a state of putridity, and is, therefore, entitled to be regarded as the *carriion beast*. If he is good to eat, so are the crow and the buzzard. Few people would be willing to eat him if they saw him in his putrid sty, with wreaths of entrails hanging about his neck, and his body smeared with blood. We are not prepared to say that eating pork fed in this way is productive of any special disease, parasitic or otherwise. It would be very difficult, and perhaps impossible, to prove. Butchers often say that pigs fed on beef offal make good pork, and better than pigs fed on sheep offal. However this may be, we can say with certainty that *human instinct* (which is sometimes better than reason) *recoils from such food*."

In Wheeling the hogs which are permitted to run at large through the streets and alleys—feeding upon all manner of the most abominable filth, and give apology for the stinking *slop-carts* that may frequently be seen laden with slops, spoiled meats from the hotels, private boarding houses, and the meat shops—go, possibly, owing to the unrestrained license to keep hogs, toward supplying the market stands with *delightful pork* and *sausage meat*; and thus are these truly "*carriion beasts*" fattened, and then do they come upon our tables!

Every city should have a meat inspector.

"An examination of the viscera of cattle brought to the rendering dock in New York frequently gave evidence of severe disease. An inspection of all the slaughter-houses was ordered to be made during the hours slaughtering was in process, and the result of the inspection proved that, notwithstanding all the vigilance exercised, diseased cattle found their way to the shambles of the most respectable butchers. This inspection proved conclusively, also, that the only safeguard against the introduction of diseased meat to the markets is an intelligent and vigilant *inspection of the animals before and during the process of slaughtering*. * * * With the erection of abattoirs and the concentration of slaughtering, such inspection would be practicable, and the sale of dressed sheep and other animals, emaciated by starvation or disease, which at present daily come to notice, would cease."

There are two extensive pork-packing establishments in Wheel-

ing, which, fortunately, are supplied from the farms of the adjacent country in West Virginia, Western Pennsylvania and Eastern Ohio. Usually the hogs are killed before they are brought to the city, and therefore the business is carried on without serious nuisance. Surely it must be a pleasing thought to the consumers of pork and bacon, whose supplies come from these packing houses, that the hogs were fattened in the country and on good food—not the *putrid stuff* found in the lanes and alleys of the city, nor from the disgusting slaughter-house pens above described.

Having closely observed the manner in which some of the “green groceries” or meat stands are kept, I am very confident that they require close watching. On several occasions during the last summer I discovered in the conduct or keeping of some of these stands not only a total disregard of cleanliness, but accumulations of *spoiled meat* which tainted the atmosphere of the whole neighborhood.

SOAP FACTORIES, ETC.

These establishments constitute a class of nuisances that are bitterly complained of in many cities besides Wheeling—*nuisances* not necessarily, but they are such because of an entire disregard of the many resources which have been afforded by which they may be averted. Several different processes, not at all expensive, have been invented by which the evils usually connected with fat-melting and soap-making can be entirely suppressed, and for that great good reason, every factory of the kind should be required to conduct the business in a manner not offensive to the neighborhood in which it is located. But the most inoffensive methods of boiling and rendering may be adopted, and yet the *stink* of such an establishment remains unabated. The strictest surveillance must be exercised to obviate the many nuisances which attach to other details of the business; otherwise, it were useless to employ the improved apparatus to which reference has been made.

The main supply of soap and tallow Chandler factories is butchers' fat, which, when delivered at the central offices and at the factories, is usually in putrid condition, and in warm weather horribly offensive, from the fact that immediately after being stripped from the animal it is thrown into tight barrels or boxes, and there suffered to remain until it is convenient to send it away to the factory, and

by the time it reaches the steam tanks—which are but little better than the old-fashioned *open kettles*—perhaps in company with the stinking carcasses of two or three hogs, with *bowels* and *bristles* dragged thither for sale by some luckless but still enterprising owner or owners—the stench of the neighborhood from the exhalation of sulphuretted and phosphorated hydrogen with ammoniacal gases is beyond the endurance of those unaccustomed to the locality; yet the persons who habitually manipulate these masses of corruption and concentrated stinks—whose own bodies are equal to so many *corpses* in smell—are among the healthiest of the laboring population.

But when I say that a bad smell may be no more unhealthy than a bad taste, I do not mean that the crusade against filth and the unnecessary production of foul odors should, for one moment, be relaxed. When the accustomed good health of butchers and soapmakers is boasted of, it should be remembered always that the occupations of these people oblige them *to work much in the open air*—and that is the secret of their health. Individual interests are too often suffered to control in such matters, thus nullifying *ordinances* which were wisely enacted for public protection. Everybody admits that pure air, in general, is essential to health; but how often do we find persons of intelligence protesting against sanitary regulation, or declaring it unnecessary in special or individual cases. Such misguided or selfish views are potent obstacles to hygienic improvement; and while their encouragement may please the few—may be the avaricious and influential—such a course exposes the majority, including the defenseless poor, to all the calamities of disease.

Pure fresh air, as “the Creator made it, is *best* adapted to the requirements of nature; *best* calculated to promote health; and, *any* deviation from the proper standard of purity, is calculated to engender disease.” That is the broad ground which should be taken by all classes of people, and it is *the* object of sanitary science to enforce this doctrine.

MANUFACTORIES AND HEALTH.



THE establishments which give employment to the largest number of laboring men and those skilled in mechanics, are the iron and nail mills, glass works, foundries and machine shops.

IRON AND NAILS.—In the manufacture of iron and nails, within the limits of the city, 2,295 persons are employed. This class of laborers is generally composed of Germans and Irish—the most of them foreign born, and, as a rule, are a hardy set of men, and from the very nature of their calling, they are trained to the endurance of fatigue and acquire great strength of muscle.

Blacksmiths connected with the mills, and whose labor is nearest akin to that of boilers, are not less healthy; yet it is somewhat remarkable that so few of either class are to be found who are over 50 years of age.

Nailers perform the work of shaping and sharpening the *bits* that cut the nails, and the keeping in order of four machines is usually the care of each nailer. These men spend much of their time at the *grindstones*, which revolve with great speed, and breathe an atmosphere loaded with mineral particles. They are generally temperate and healthy, and a few of them have grown old in the service of the mills, but the large majority of them are young men. This majority, however, is not produced by the early death of the operatives, but the result of the wealth and independence which a few years at the business insures. What would be the effect produced were they to continue their trade for a longer period or make it a life-long business, is not difficult to foretell. Notwithstanding the usual short term of service in the large and well-ventilated mills, and the seeming good health of this class of operatives, "*nailers' consumption*"—a form of chronic pneumonia—

is of sufficient frequency among them to attract attention. In two cases of long exposure to the dust of the mills, post mortem examination revealed *carbonaceous lungs*. Nail feeders represent all ages between 8 and 60 years. There are many small boys among this class of workmen who, perched upon their stools before the machines, day after day, and week after week, perform regular *turns* with the men. These little fellows are usually pale-faced, and from their bent position of body, soon become stoop-shouldered; and this is the type of their stunted growth, if they continue at the business. It is asserted by those who are entirely familiar with all branches of the nail manufacture, that *feeders* are the healthiest of all the workmen employed, and I believe this opinion of them to represent the truth, though they frequently suffer from imperfect digestion and, after puberty, from hemorrhoids, because of their sitting upon hard seats.

In the manufacture of glass, there are from eight hundred to one thousand persons, of both sexes, constantly employed, including many small boys and girls.

Those who work at the *pots* or furnaces, called *dippers*, are more constantly exposed to even greater heat, if possible, than iron boilers; besides, the former are within doors and occupy comparatively closed quarters, while the latter are positively out of doors or are only sheltered over-head. For this reason the workmen in glass are more exposed in cold weather to sudden and very great changes of temperature as often as they go in and out of doors, and hence are more liable to acute inflammatory attacks. During the past two years, I have seen two cases of emphysema of the lung with dilatation of the heart among *glass blowers*; but I have not been able to assure myself that these conditions are more frequently met with among these workmen than those of any other trade or business calling. As a rule, all classes of these operatives are generally healthy; and it may be said that in every branch of manufacture and labor, the escape from accident is so complete that for *one person* killed or injured by factory machinery, probably *fifty* perish from preventable diseases—mainly produced by intemperance and its companion vices.

ALIMENTATION, ETC.



IN Wheeling, the inhabitants generally live on plain, substantial food, principally wheat bread, beef, pork, bacon, mutton, domestic fowl, with potatoes and other culinary vegetables. The laboring population is uniformly well fed, and there are but few families among the lowest classes who do not receive animal food at least once a day. There are two market houses in the city, and four market days weekly, at which places and times are exposed for sale substantials and delicacies of every variety. The fruit supply is usually abundant, and of the choicest quality. There are also conveniently located numerous *green groceries*, at which fresh meats and good vegetables may always be had at prices according to the market schedule. During the winter season all classes, ("Orthodox" Jews excepted) consume more or less pork; and the *sausage makers* do a thriving business.

During the last year, three cases of *trichinous* disease were reported, in a German family in North Wheeling. It is said they were treated by *carbolic acid packing*, and all recovered, after many weeks' illness.

There is but little corn bread used by either class of people, and perhaps the greatest departure from the daily routine of wheat bread is in the use of *buckwheat* flour during the winter months, and then, as the result of such indulgence, follow uncomfortable itchings of the skin and much *scratching*. There are several bakeries in the city, and while these supply good bread daily to hundreds of families, at least nineteen-twentieths of all the housekeepers bake their own bread. In the baking of *heavy bread*, as well as pastry generally, "baking powder," of Wheeling manufacture, is used, instead of yeast or other "rising." There are three or four brands of baking powder put up in the home market, all of them com-

posed of cream of tartar, tartaric acid, and bicarb. soda—but, no doubt, widely differing from each other in the proportions of these articles employed in its manufacture. One of these *powders* has established a reputation in other cities, because of its acknowledged excellence; and the business done in this line alone by the proprietors is immense.

Among all civilized nations, bread constitutes the staple article in the food of man. It has been appropriately termed the staff of life—but in order that it may prove a staff, substantial and pleasant, and not a “*broken reed*,” it is all important that it be good—sufficiently baked, light, and sweet. I have been assured by bakers on whose testimony I could rely, that they use generally the best flour the market affords; that they do not mix mashed potatoes with the dough, nor *alum* to make the bread white and light—methods which are employed by some unprincipled bakers in other cities to enhance their profits. Recently the mills have engaged in regrinding the *shorts*, by which process cheap flour is offered to the poor, who—if they cannot enjoy the so-called table comforts, luxuries, and dainties at the command of the rich—eat really the best quality of bread from necessity—because it is *dark*, and therefore costs the least sum of money. In other words, the rich eat the *starch* or comparatively innutritious white bread; the poor, the *gluten* and phosphates or highly nutritious dark bread, and thus are saved to the miller 50 or 60 lbs. of flour on each barrel over the old method of grinding, and to the consumer a precious gift—the nutritious element of flour.

A great deal has been said of late by chemists relative to the importance, in a dietetic point of view, of consuming the entire wheat grain, in place of that which is now commonly used.

“The reason given,” says the London *Lancet*, for December, 1870, “as is well known, is that the branny parts of the grain contain the earthy salts, which go to form bone in particular, and the cereal, or peculiar body which changes starchy matter into dextrine. Whilst we have, on more than one occasion, commended the use of entire wheat flour, and condemned that of mere starchy compounds, especially in the case of the young, we have counselled the subtlest pulverization of the branny portion of the grain, so that its irritant qualities may be destroyed, and appealed to the chemist for a more complete analysis of the entire wheat flour, and particularly of the latter after it has undergone the ordinary process of cooking or roasting; so as to determine the changes

undergone through the agency of the cerealin, and in the cerealin itself.

"The fine ground flour of the wheat grain is proved, therefore, to be altogether the most desirable for general consumption, and we hope it will take the place of the purely starchy compounds now in use, both in the case of children and of adults."

Good and sufficient food is an element of the very first importance in the promotion of health, and the prevention of disease.

It is said, proverbially, that poverty favors longevity, because the poor do not suffer the habitual penalties begotten by luxury and wealth. As has been asserted on a previous page, no *dictum* is more fallacious, for it has been abundantly shown that the value of life is less among the impoverished than the rich; that of an equal number of infants of the same age, double the number will die of the poorer than of the wealthier classes. In other words, where there is the greatest misery, there is the greatest mortality. In the cities especially, pauperism and destitution are a deplorable source of mortality in a variety of ways. Food and raiment, and shelter, are not only health, but they constitute, to a great extent, morals, law and religion.

"We can starve muscle by withholding nitrogen. We can starve the fats of the body, and destroy the animal heat, by withholding carbon. So, too, we can starve the brain by withholding phosphorus; and starve the blood by failing to supply it with those salts of lime, potash, iron, magnesia, which are essential to its healthy condition."*

"The first rule I would lay down," says Dr. Alfred L. Carroll, "is to give as much nutriment as can be digested and assimilated, regard being had in special cases to the elements most needed, and to the comparative powers of gastric and intestinal digestion. Thus, for instance, we may have a case wherein respiratory food is called for, and yet the alkaline, intestinal digestive function may be inadequate, while the stomach is still in working order. Here, and in all cases where emaciation and innutrition are caused by excessive oxidation of albuminous matter, the ingestion of gelatine will be found useful, since it offers us respiratory materials digestible in the stomach.

"Next to this first general principle of supporting the powers of nature, and endeavoring to secure the nutrition of all the tissues, we should ascertain what elements are redundant or deficient in any given disease, and increase or diminish the supply of these in our dietary list. Thus, where nervous power is defective, meats,

*Dr. S. B. Hunt's Essay on Army Alimentation.

(which are rich in phosphates,) or, still better, fish,* should enter largely into the regimen. Meats and milk also contain about one per cent. of iron, and should therefore form the chief portion of the diet in anæmic conditions. This mode of treatment is exemplified in the management of scurvy and some other disorders. * * * An indication not to be overlooked in this connexion may, in many instances, be derived from the particular desires of the patient. As the needs of the solids or fluids are generally expressed by the sensations of hunger or thirst, so specific wants of certain tissues are frequently shown by a craving for a certain kind of food. In winter, we have an instinctive liking for fatty substances, which are repugnant to us in summer; and, per contra, we fancy in hot weather acidulated drinks and non-respiratory substances, from which we are inclined to abstain in the colder months. In disease, within certain limits, a strong desire for a peculiar article of diet may often be regarded as the still small voice of some suffering tissue, urging its wants above those of its fellows."

There are certain modes of treatment of disease usually supposed to be medicinal, which, in reality, are purely dietetic and hygienic. How many people, even among physicians, are there who look upon cod liver oil as being anything else than a nauseous physic? *It is a most valuable food*; and notwithstanding the familiarity of the profession with its virtues, and therefore its already extensive employment in practice, I am confident that as a food it is not sufficiently employed in the *nursery*, or for the correction of *mal-nutrition* of infancy and childhood. Many children, at birth, are so thin and poor in flesh, that they seem to have been really *starved* in utero, and when but a few days old, present a *wrinkled* and *aged* appearance. Along with this condition frequently, the stomach is so irritable that it rejects even mother's milk, and every attempt at sucking aggravates the diarrhœa, which, perhaps, set in at birth. In such unpromising states of the system, I have in many instances witnessed the truly wonderful powers and efficacy of cod liver oil, which, when administered in small doses, and with from one to two grains of subnit. bismuth, is easily retained by the stomach. In cases of such extreme irritability of the stomach that the oil could not be retained, I have given the bismuth—prohibiting everything else, either of food or medicine, by the stomach—and ordered *inunctions* with cod liver oil, from head to foot once or twice a day, and the child wrapped in flannel, notwithstanding the

* Fish, according to species, contain, of nitrogenized matter (including gelatine), from 13 to 24 per cent.; of fatty matter, from 6.36 to 13 per cent.—*Carroll*.

assertion once made by a self-styled oracle, that "the mother is a fool who would subject her child to such filthy treatment." Of course, Eustace Smith's excellent book had not then been heard of, nor poor, starving, wrinkled, withered infants been rescued from the grave by the almost magical influence of this simple, but greasy mode of treatment; therefore, "the times of such ignorance" should be winked at.*

There are many brands of cod liver oil on the market, but none seem to give more general satisfaction, both to patients and physicians, than the oil manufactured by Messrs. Caswell, Hazard & Co., of New York. This oil is as inoffensive to the stomach as cod liver oil can be made, and it is usually taken, especially by children, without the least disgust.

INFANT FEEDING.

The subject of infant feeding is second to none other in importance. Upon its right appreciation very much depends the growth of communities, of States and of nations. It is, therefore, of the deepest interest to all who feel a true philanthropy—the desire to shield, as far as possible, the offspring of the rich and the poor from suffering, by reducing disease, from premature death, and of insuring in after-life symmetrical and healthy frames. In a word, it involves the problem: "How, out of the existing seed, to raise races of men to divine perfection."

How many *first* children are lost by wasting sickness, the despairing young mothers—though they have taken their degrees in Greek, Latin and French, in music and painting and other fine arts—know not why! Baby digestion, baby nursing, and the rearing of immortal souls have been no part of their education; they have not been taught the important lessons how *not* to destroy their future children; and, as a consequence, there is witnessed so much retired, quiet, sincere grief, excited by the little vacant chair or cradle, mementoes which can never be effaced. In all cities and countries the deaths amongst children constitute the majority of the current mortality; but the mass of the public look mainly to the loss in staff and rank and file amongst those who are shoulder to shoulder, actively fighting the battle of mature life.

* *The Medical Times*, Nov. 15, 1870, Philadelphia.

By food, we are to understand that kind of aliment which best conduces to nutrition, growth, and strength; "which is capable," says Mr. Erasmus Wilson, "of producing the most complete development and highest amount of power of the human being; which, in one word, creates health; for in health we have the only trustworthy antagonist of disease. * * * We have one grand example before us, in which nature prepares the food of the human being with her own hand, and administers that food at stated periods, and according to a prescribed rule. We may ask, What is that food? What are those periods? What is that rule?"

"The food is milk, the first food of the newly-born man; animal food. * * * * *

"Looking to the milk as the food of the infant man, we see the importance which attaches to the perfect purity of the milk, its sufficient quantity, and its regularity of supply; in other words, of a healthy mother—of a mother to whom the nourishment of the future man is a primary and not a secondary purpose of life—of a mother whose instincts harmonize with those laws of nature which govern her infant and should equally govern herself.

"But let us take the reverse of these propositions: an unhealthy mother; unwholesome milk; irregularity of exhibition of that milk. I need hardly say that the results must be an unhealthy, weakly child; or, in other words, a fractious, crying child, the subject of vomiting, colic, convulsions, painful dentition, scrofula, rickets, tabes, etc. Is not this preventable disease?"

"But as preventive medicine is especially interested in remote predisposing causes, let me adduce a few illustrations. A lady was called upon to give a dinner party a few weeks after her confinement; the excitement of that dinner party cost her infant an eczema. Within the last week a young woman brought her babe to me covered with eczema from head to foot. The colloquy which took place between myself and the parent was as follows: 'How old is your child?' 'Four months.' 'How long has he had this eruption?' 'Since he was three weeks old.' 'What occurred immediately before the appearance of the disease in your child to cause you annoyance?' 'I was vexed by my servant.' 'And what since?' 'I have been vexed to see my poor child in this miserable state.' 'Have you sufficient milk for him?' 'No; I think I must begin to feed him.' 'By all means do so; that is your only chance of rearing him at all.' I could multiply cases of this nature almost indefinitely were it necessary; their relation to the subject before us is self-evident, and I adduce them only as examples of causes disturbing the healthy composition of the milk, and consequently engendering disease in the child.

"But a period comes when milk is no longer a diet of children, and when custom, originating, as we have seen, in Nature's promptings, has determined the necessity of three meals in the day. The infant demands more than three meals, and makes no distinction

between the day and the night. The day of the infant is a day of twenty-four hours; the day of childhood, as of the remainder of life, has a duration of twelve to sixteen hours.

"The diet of children of all ages should be, a substantial breakfast, with animal food in some shape; a substantial dinner of meat, vegetables, and cereal pudding; and a substantial supper, consisting, in part, of animal food. The drink may be milk, tea, cocoa, and, possibly, beer. I would call this the diet of health; a diet capable of making a strong body and also a strong mind; and a diet capable of preventing disease.

"Assuming that the amount and richness of the supply of food should be determined by the offices which it has to perform, there is no period of life when more food is required than in childhood and youth. The hard-worked laborer, in a long summer's day, scarcely exhausts a greater quantity of nutritious matter than a growing boy of ten or twelve years of age; in the laborer the consumption is waste; in the growing boy it is bestowed in the construction of the body, in developing and building up the future man. And it is no uncommon thing to find that although the general construction of the body has been fairly performed, there is some one organ of the economy that has fared less well than the rest, and that part not uncommonly the skin; hence the origin of acne, of the ringworms, *et hoc genus omne*.

"Parents are too apt to take their own stomachs as the standard of diet of their children; a cup of tea and a slice of toast suffices for them, so it must suffice for the little ones. I knew a lady who brought up her children on mutton alone, because she herself could digest nothing but mutton. Her children were a feeble, puny, sheepish race, always in the doctor's hands. A mother has heard somewhere that suppers are heavy and interfere with sleep; so, the children must be content with their tea, and go supperless to bed. Parents have rights over their children, but not the right of feeding them in such a manner as to make them the subjects of disease. Such parents become the authors of a puny and degenerate race, and are unintentionally traitors to their country.

"If the two periods of life already adverted to be important in their influence on the future man—namely, the period of infancy, ranging from birth to the age of two years, and the period of childhood, ranging from two years to seven years—the next two periods—namely, those of boyhood and youth—are equally so. While the food of the infant and the food of the child are abundant and regular, the food of the boy and the food of the youth should be the same. Both are occupied in the great business of growing life; on both are dependent the future man, for his strength and for his manhood.

"Boyhood and youth have besides other duties to perform—namely, cultivation of the mind or education; and then the question arises whether these two important processes are equally provided

for in the training of youth. To be well instructed mentally, they must be properly fed physically; and at no period of life are the three ample meals of mingled animal and vegetable food so necessary.

"It is notorious that the importance of a substantial regimen is not sufficiently recognized in scholastic establishments; and the consequence to the pupils is debility and disease, a constant appeal to the doctor for tonics *vice* food, a frequent outbreak of ringworm, and worse than all, the development of scrofulous tubercle, the laying of a foundation for future organic disease and morbid life, or premature death.

"I must not be supposed to undervalue light, and air, and cleanliness, and exercise, the kindred of food; and if it were my commission to improve the human race; to produce finer, stronger, and better men; to extinguish disease; I should begin with food; and if it were my duty to lay down rules for the prevention of disease, I should, in the first instance, endeavor to secure the coöperation and influence of man's first and best friend—his stomach."—*Med. Times & Gaz.*, Jan. 7, 1865.

WHEN CHILDREN SHOULD BE WEANED.

The period of weaning is always a critical one, and is therefore worthy of consideration. Undoubtedly the process should take place gradually when circumstances will allow.

"Nature advances; never leaps."

In his rich legacy, entitled "Letters to a Young Physician," Dr. James Jackson gives special directions on this subject. He says:

"When I commenced practice, I was unable to get at any rules on this subject. The first question was, at what age children should be weaned. Neither the books to which I had access then or since, nor the medical fathers around me, gave any reliable information on the point." * * *

Comparing what he had been able to learn from mothers and experienced nurses, with what passed under his own observation during a long practice, he came to these conclusions, which were originally published in the "New England Journal of Medicine and Surgery:"

"Children are benefited by living principally on the breast for twelve months; their vigor is evidently impaired, in almost all cases, when they are nursed less than nine months. The safest period of the year for weaning is from the middle of October to

the middle of March, provided they be not weaned under ten months after December, under eleven after January, nor under twelve after February. Children who are weaned at the age of twelve months, in March, are ordinarily safe; those who are weaned at this age in April, are less so, one-half of them, perhaps, suffering severely in the subsequent summer or autumn. In May, the danger increases; and in the four subsequent months, if a child of any age be weaned, it will, in most cases, be very sick before the middle of October ensuing. The disease does not immediately follow the weaning, though in many cases the diarrhœa of teething children ensues at once. But the instances, in which children who are weaned between May and October escape severe cholera infantum, are extremely rare indeed. * * * Those children who love meat and relishing food; who digest their food well; who are in perfectly regular habits as to their alvine evacuations, and who sleep well, are the best qualified to bear a deviation from the rules suggested above."

The moral obligations resting upon mothers to rear their own children by the means nature has given them, ought not, except from very great necessity, to be evaded or disregarded; for truly the *denial* of this blessed privilege cannot otherwise be considered than as a sad misfortune to both mother and child. According to Dr. Mapother, in sucklings the average mortality is 37.1 per cent., while among the hand-fed, it is 63.9 per cent.

Finally, I remark on the subject of infant feeding, that children, to live, must be well fed, have good *water* and *milk*: and the mortality among them affords a most sensitive test of the *quantity* and *quality* of these supplies. Of the two extremes, children are oftener underfed than overfed; and, besides, the influences of transmissible weakness, if not disease, from parents, the poor diet being aided in the majority of instances by quacking and drugging with Winslow's Syrup and other offending nostrums, is it any wonder that so many of them die in infancy?

POISONOUS CONFECTIONERY.

This is a most fruitful cause of disease and death among children.

Red Colored Confectionery.—Of twenty-seven samples of this color examined by a recent writer; one was colored with *lead*, and three with *vermillion*, a preparation of mercury, and very poisonous.

Yellow Colored Confectionery.—Of twenty-three samples examined, thirteen contained lead, and were actually poisonous. Some of these were lozenges, and very poisonous.

Blue Colored Confectionery.—Of twelve samples examined, six were colored with poisonous pigments.

Green Colored Confectionery.—Of five samples, all were found to be poisonous.

Uncolored Confectionery.—Of twenty-three samples, all were found to consist of sugar mingled with gum, starch, and sulphate of lime, and flavored with various essences. There was nothing actually poisonous in any of them, but in some the proportion of lime was very large.*

Many a child, already suffering the torments of colic brought on by the gift of a poisonous candy, has been coaxed to still his cries by the offer of another and still more liberal dose of the same sort, prescribed, may be, on the principle of that most ridiculous of all medical nonsense—*similia similibus curantur!*

DRINKS, ETC.

The consumption of coffee, tea and sugar is very general, and yearly on the increase. Mixed teas—black and green—have become popular during the last few years, notwithstanding their frequent adulteration, and the danger of mistaking the redried leaves, over which pigs and dogs have freely promenaded in the streets and alleys of Shanghai, for the delightful “Fine Morning Congou.”

The character of the milk supply in Wheeling is certainly very good, and in this respect both mothers and children are blest above the ordinary rule of city measure. As Health Officer, I made this a special subject of inquiry, and found that with but few exceptions, the cows were well-fed and cleanly kept in the country, or at least, beyond the city limits. In a word, that good milk was daily served to the people at from eight to ten cents per quart. In the milk supply of all cities, there is more or less fraud perpetrated,—in the systematic dilution of the milk with water. In New York, according to Prof. Chandler’s report, “the average per centage of pure milk in the adulterated article with which the city is supplied, is 73.28; or, in other words, for every three quarts of pure milk there is added one quart of water.”

The total amount of milk supplied to the cities of New York and Brooklyn annually, is about 120,000,000 quarts. To reduce this to the quality of the city supply, requires an addition of 40,000,000 quarts of water, which, at ten cents per quart, costs “the snug sum of \$4,000,000 annually, or about \$12,000 per day.”

Wheeling ice cream does not uniformly afford so much gratulation, for the reason that it is too often made of skimmed milk, to which arrowroot is added, and may be, a small quantity of good cream.

* See Octo. No. Good Health, 1870.

SPIRITUOUS LIQUORS.

“ Though I look old, yet I am strong and lusty ;
 For in my youth I never did apply
 Hot and rebellious liquors in my blood ;
 Nor did not, with unbashful forehead woo
 The means of weakness and debility.
 Therefore my age is as a lusty winter—
 Frosty, but kindly.”

AS YOU LIKE IT.—Act II. Scene 3.

Spirituous liquors of very bad quality are much used, but not to their former extent. There are in the city, including South Wheeling, seventeen wholesale and retail liquor stores; eighteen ordinaries; fifty coffee houses, first-class; fourteen second-class, and eight breweries. From these come many bitter fruits, in the *purchase* of which, annually, enormous sums of money are expended.

The domestic wines sold vary in strength from three to thirteen per cent. alcohol. Malt liquors from three to five per cent. alcohol. To the credit of the Wheeling brewers be it said, that in the manufacture of beer, ale and porter, they are careful to employ the best quality of barley and hops, thus affording the consumers of their liquors, the majority of whom are laboring men, an honest—and when not taken to excess—tonic and nutritious beverage, entirely free from poisonous adulteration with *nux vomica*, *coculus indicus*, *Calabar bean*, and other deadly drugs. In feeble conditions of body, howsoever produced, malt liquors of good quality are often productive of excellent tonic results. In such conditions *stock ale* is of the greatest value, and when administered with cod liver oil—the taste of which it completely disguises—the analeptic property of both articles is greatly increased. Thus administered, cod liver oil is often retained by weak stomachs when every other kind of food is promptly rejected; and in all cases of faulty nutrition dependent on want of assimilation of fatty matter, this vehicle possesses, indeed, excellent advantages, and is *safer* than whisky or brandy.

The drinking saloons are closed on Sunday, for which reason but little opportunity is afforded for Sunday debauch, and consequently very few arrests are made by the police. But on holiday occasions, when the drinking houses are all open, then come examples of dissipation and vice; and it is a familiar fact to physicians in all cities, that such days, besides filling *lock-ups* and occupying police courts, are immediately followed by a large increase of sickness among the poor.

SCHOOLS AND COLLEGES.



HEELING is justly proud of her system of free education, and handsome school edifices, which are generally large, well-ventilated, and supplied with furniture of modern pattern. Each ward has its school, in which both English and German are taught. There is also a school provided for the colored people on city account, which has an average attendance of forty scholars, between the ages of six and forty years!

The play-grounds connected with the school buildings are ample, and thus health-promoting frolic is encouraged during the period of recess.

The hours of school are from nine to twelve, and from half past one to four, including fifteen minutes recess before and after noon; and although these hours of study are a vast improvement upon the custom of ten years ago, the daily confinement is yet too long by at least two hours, for the reason, that it neglects the cultivation of the physical powers, and to that extent is unnatural and incomplete. Without sound physical development—the value of which is so often either forgotten or ignored by teachers and parents—there can be no lasting mental activity; and in proof of this radical defect in our public or free school system, there are to be seen in all the schools, many pale faces and feeble constitutions, especially among girls, the natural fruit of the ordinary process of intellectual cramming, whose sickly seed will still further degenerate the race.

It is unfortunately the case too frequently that *puny bodies* and *precocious minds*, which so often go hand in hand, are pushed at school to the lamentable extent of making “philosophers at ten and fools at forty years of age.”

"The teacher and the school committee," says Professor Samuel Kneeland, "ought to know not only how reading and writing should be taught, but how the muscles should be developed. Far better for sound learning would it be if one hour out of three spent in school should be devoted to the sports of the gymnasium.

* * * It is a consummation devoutly to be wished that the time may soon come when the heads of our learned men shall no longer appear to have crushed their bodies, when our mothers and grandmothers can no longer be considered as of the same age, and when our youths and misses of twelve years shall cease to look and act like pigmy old men and women under the caricatured title of 'Young America.'"

Again he says: "It would be well if Russian despotism could be introduced for a generation into our schools, especially those for girls; and that their regulating autocrat should be one who would look upon a bent frame with the same horror that he would upon a crooked pot-hook, a misspelled word, or a fault in grammar; and that examining committees should see that a boy could jump as many feet as he could spell syllables in one word, and a girl could skip the rope as many times as she could enumerate insignificant towns upon a long and foreign river."

How truthful and yet how lamentable the following picture of female education as fashionably imparted:

"The young girl at the age of fourteen, with a graceful form, rosy cheeks and elastic step, enters the fashionable school; the exuberant spirit of youth is not considered lady-like, and must be repressed by the teacher; studied attitudes and unnatural position take the place of graceful activity; by confinement at her books and embroidery she loses all inclination for exercise at home; the mother seconds the teaching of the school-room by confining her at the piano or condemning her to frivolous and useless accomplishments. Thus, the unnatural work goes on, and she becomes an inert mass, without energy, listless and deformed, a mere puppet in the hands of the milliner and mantuamaker, a walking frame for the display of silks, satins, furs and laces—and thus, with her superficial accomplishments, she educates herself for an early grave, or, worse still, entails upon her innocent children a weak constitution, to be still further debilitated by a fashionable education."*

In the public schools of the city physiology and hygiene form a part of the general education, and these branches have been found most interesting to the young. Dr. Dalton's little Treatise on Physiology and Hygiene is unsurpassed by any book of the same kind, and should be in every school in the land.

* Good Health. May No. 1870.

Besides common schools, there are several flourishing private schools, Protestant and Catholic, primary and college, for both sexes. The advantages presented in Wheeling for the thorough education of young ladies are truly excellent.

THE WHEELING FEMALE COLLEGE.

This institution is situated on the highest grounds in Centre Wheeling, and commands a beautiful view of the adjacent country. The college building, comparatively new, is large and well ventilated; and in all of its appointments, including bath-room, furnaces for warming, etc., the sanitary supervision and discipline, is as unexceptionable as the educational facilities and advantages of the establishment are thorough and superior. By its officers and teachers, physical education is regarded of first importance, and every inducement is afforded the students to become familiar with the simple laws by which health and symetrical development of body may go hand in hand with a well cultivated mind.

Besides ample inviting grounds for out-door exercise, there is in the building a large room set apart for gymnastic exercises, instruction in which is given daily to the students by a competent teacher.

At this school the most finished education may be acquired at moderate expense. It is now under new management, and was never in more flourishing condition.

THE YOUNG LADIES' INSTITUTE.

This recently-established Protestant Institution, situated on Fifth street, in the very heart of the city, has fixed a high standard of claims, which it is, no doubt, fully able to maintain. It has already received a liberal patronage.

MT. DE CHANTAL,

The best appointed Catholic school in the country for young ladies, is situated within two miles of Wheeling, on the line of the Hempfield railway, near the Peninsula grounds, particularly described on a preceding page. The location of this school is beautiful, indeed, and one of the most attractive spots in the vicinity of Wheeling.

ST. JOSEPH'S ACADEMY,

A Catholic Institution for males, occupies a part of the Cathedral Buildings on Fifth street, and is constantly well attended.

HOSPITALS.



HEELING cannot boast of a becoming public charity for the sick poor. The city has nothing of the kind in keeping with either the intelligence, wealth, or accustomed liberality of its citizens, who in private life have

“An ear inclined to every voice of grief;
A hand that opes spontaneous to relief;
A heart whose impulse waits not on the mind
To freeze, to doubt when charity's enjoined;
But springs to man's warm instinct for mankind!”

and but for the benefits presented by the Wheeling Hospital—a private enterprise, under the direction and good management of the Sisters of Charity—we should have the discredit of being without even the name of such an institution.

The fees are from \$3 to \$7 per week, exclusive of professional attendance, and patients are at liberty to employ from the city faculty, physicians and surgeons of their choice.

The only institution for the care of the sick under city control, is the so-called Pest House, which is set apart for the reception and care of smallpox patients. It is a one-story frame building, containing three rooms, and situated on the bank of the creek, outside of the corporate limits. Every winter it accommodates several patients, principally negroes and mulattoes, from Cincinnati and Pittsburgh.

THE WANT OF A CITY ALMS-HOUSE.

The erection of an ample alms-house is a measure imperatively called for by every consideration of humanity and public health. Take the indigent sick of the community; how many impediments penury opposes to their recovery from disease and debility, and

yet, how valuable to the city and to the State, the life and health of the humblest citizen!

The Young Men's Christian Association, whose influence has grown to be a power of great importance in the community, have already had the matter before them for consideration, and it is sincerely to be hoped that they will determine to erect the long-needed charity with as little delay as possible.

A new county alms-house, situated six miles from the city, is now being erected, and will, when completed, prove a God-send to the county poor; but it will not by any means, (though we have to pay seven-tenths of the bills) fill or accommodate the severe want of a city infirmary, nor of a house of correction, for the government of the almost incorrigible boys and girls that are running at large and to ruin in the streets.

THE CHILDREN'S HOME.

This greatly needed charity for orphan and homeless children was established several months ago under the auspices of the Young Men's Christian Association, and is in the most flourishing condition. It is temporarily located at the foot of Market street, north of the creek, but the Directors are now on the search of a permanent location, which, doubtless, will soon be found. Already, there have been picked up from the streets twenty-five homeless outcasts, who are receiving its benefits, and under its discipline will grow up useful and respectable members of society. Surely its mission is a noble one!



MARRIAGES, BIRTHS, DEATHS.



It is sincerely to be regretted that we have no complete system of registration of marriages, births, and deaths. It is true, there is a State law which pretends to be complete, but the annual returns made by the assessors constitute nothing reliable, but show its total inefficiency.

THE RECORD OF MARRIAGES should show the date and place of marriage; the name, residence, and official station of the person by whom married; the names and the places of birth of the parties; the residence of each; the age and color of each; the condition of each—whether single or widowed; the occupation; the names of the parents, and the date of the record.

THE RECORD OF BIRTHS should show the date of the birth; the place of birth; the name of the child, if it have any; the sex and color of the child; the names and the places of birth of the parents; the occupation of the father; the residence of the parents; the physician or midwife who was present and assisted in the birth, and the date of the record.

THE RECORD OF DEATHS should show the date at the death; the name of the deceased; the sex; the color; the condition—whether single, widowed or married; the age; the residence; the occupation; the place of death; the place of birth; the names and places of birth of the parents; the disease or cause of death; the duration of last illness; the place of burial; the physician or surgeon who had charge of the patient, and the date of the record.

Such returns by ministers of the gospel, justices of the peace, parents, kindred, householders, physicians, and accouchers, should be *compulsory*; and to insure correct and prompt registration, a sufficient penalty should attach to delinquency. It is to be hoped

that the Legislature, now in session at Charlestown, will duly consider the importance of this subject, and enact a law which shall embrace the most complete returns.

The following table is compiled from the license records filed in the Clerk's Office, during five years ending December 31, 1868. But many of our young couples make excursions "O'er the border," and are united in wedlock according to the more liberal usage of Pennsylvania. If the number of these were known, doubtless the annual total would be increased by fifteen or twenty.

TABLE I.

MARRIAGES AND NATIVITIES.

	American.	German.	Irish.	English.	French.	Total.	Widower.	Widow.	Widower & Widow.
1864	54	37	9	3	2	105	17	5	4
1865	76	51	17	5	3	152	16	9	6
1866	64	52	24	10	2	152	22	21	12
1867	81	66	22	6	2	177	17	17	5
1868	85	69	12	10	3	179	20	21	7
Total.....	360	275	84	34	12	765	92	73	34

Average age of American males, 27.81.

" " Irish " 27.19.

" " German " 28.75.

Average age of American females, 22.74

" " Irish " 24.66

" " German " 24.81

According to the returns from which the above has been constructed, the greatest disparity of age is among Americans: Male, (bachelor,) 72 years; female, (miss,) 15 years! In recording nativities, I have recognized the husband's place of birth as the standard of division. Americans and Germans freely intermarry; American and Irish, or German and Irish, not frequently.

For valuable assistance in searching out these figures from the records filed in the County Clerk's Office, I am indebted to W. L. Parkinson, Esq.

BIRTHS.

From the register of births the following figures have been derived:

TABLE II.

BIRTHS FOR SIX YEARS.

Year.	Males.	Females.	Twins.	Males.	Females.	Total.
1863.....	210	180	6	4	7	390
1864.....	160	153				313
1865.....	226	172	16	10	6	398
1866.....	144	168	7	3		312
1867.....	183	173	12	10		356
1868.....	301	269	6		2	600
1869.....	318	320				638
	1,542	1,435	47	27	16	3,007

There are included in this table but twenty-five colored children, which in all probability does not represent the whole number of this class of births within the limits of the city. Otherwise the returns are no doubt in the main correct. In 1866 one case of *triplets* was reported.

DEATHS.

The Annual Mortality of the City of Wheeling for Ten Years.

1861.....	346	1866.....	311
1862.....	394	1867.....	322
1863.....	389	1868.....	339
1864.....	444	1869.....	277
1865.....	445	1870.....	259

TABLE III.

COMPARATIVE STATEMENT OF THE DEATH RATE

In the City of Wheeling, with that of the cities of Boston, Charleston, New Orleans, St. Louis and San Francisco.

	Population.	Number of Deaths.	Deaths to 1,000 persons living.
Wheeling.....	20,000*	277	13.85
Boston.....	240,000	5,522	23.00
Charleston..	25,000	1,208	34.51
New Orleans.....	170,000 (?)	5,593	33.00
St. Louis.....	285,000	5,834	20.48
San Francisco.....	165,000	3,808	23.00

* Not including Richietown.

TABLE IV.

MONTHLY MORTALITY OF THE CITY OF WHEELING FOR THE YEAR 1870,

Also Ratio of Deaths from different diseases, based upon returns for eleven years, compared with London and New York.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Wheeling	New York	London			
													D'ath	Pop'n	D'ath	Pop'n	D'ath	Pop'n
Accident.....	1	2	1	1	3	1	1	1	1	1	1	1	1	1,630	1	873	1	1,355
Bronchial.....	1	1	1	1	1	1	1	1	1	1	1	1	1	6,111	1	968	1	483
Cholera Infantum.....	1	1	1	1	1	6	7	2	1	2	1	1	1	880	1	1	1	1
Croup.....	1	1	1	1	1	1	1	1	1	1	1	1	1	3,666	1	991	1	3,111
Congestion of Brain.....	3	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Delirium Tremens.....	1	1	1	1	1	1	1	1	1	1	1	1	1	8,800	1	8,645	1	22,835
Diarrhoea.....	1	1	1	1	1	1	1	1	1	1	1	1	1	2,000	1	380	1	1,212
Dysentery.....	1	1	1	1	1	1	1	4	1	1	1	1	1	5,500	1	3,146	1	26,851
Diphtheria.....	1	1	1	1	1	1	1	3	2	1	1	1	1	2,600	1	918	1	3,755
Disease of the Heart.....	2	1	1	1	1	1	1	1	1	1	1	1	1	3,385	1	1,409	1	1,015
Debilitas Senilis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1,833	1	2,959	1	805
Dropsy.....	1	1	1	1	2	1	1	1	1	1	1	1	1	2,200	1	2,531	1	3,969
Convulsions.....	2	1	2	1	1	1	3	1	1	2	1	1	1	1	1	1	1	1
Enteritis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1,467	1	1,677	1	8,613
Enteric Fever.....	1	1	1	1	2	1	1	1	1	1	1	1	1	1,000	1	1	1	1
Scarlet Fever.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1,456	1	990	1	855
Ignotus.....	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Hepatitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Inflammation of Stomach.....	4	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Puerperal Fever.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Marasmus.....	2	2	2	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1
Measles.....	1	1	1	1	1	1	1	1	1	1	1	1	1	3,143	1	4,186	1	1,772
Pneumonia.....	1	4	5	1	1	5	1	1	1	1	1	1	1	846	1	519	1	788
Phthisis Pulmonalis.....	1	4	5	1	1	5	1	2	2	3	1	1	1	550	1	253	1	369
Premature Births.....	1	1	1	1	1	1	1	1	1	1	1	1	1	2,000	1	3,409	1	2,963
Small Pox.....	1	1	2	3	1	1	2	1	1	1	1	1	1	1	1	1,363	1	1,384
Still Born.....	1	1	2	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1
Whooping Cough.....	5	4	7	5	5	4	11	9	1	3	2	5	1	3,666	1	7,787	1	1,333
All other Diseases.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	21	28	26	16	16	30	26	28	16	17	16	19						

I cannot sufficiently express my regret that the amended health ordinance, under which so much good has been accomplished during the past two years, did not prescribe a *form* of death certificate that would have embraced all the facts which ought always to be known—the name, sex, age, color, parentage, occupation and condition, particular residence (naming the ward and street), and disease or cause of death. In many instances the certificates are lamentably indefinite as to the cause of death, for which reason, and to make sure that the number of cases of *pulmonary phthisis* recorded in the above table is sufficiently large, I have included all the cases of “consumption,” “phthisis,” “pulmonary disease,” “lung disease,” “lung affection,” “effects of pneumonia,” “scrofulous disease of the lungs,” and such other names as induced me to suspect the disease.

It seems reasonable to suppose that physicians, above all others,

would more readily appreciate the subject, and that they would endeavor to make the record of a death as full and as accurate as possible.

An examination of the foregoing tables will show very clearly the sanitary condition of Wheeling. It is questionable whether any other city of the same size in the United States can show as clean a bill of health. The death-rate, it will be seen, is given at *thirteen and a fraction deaths to one thousand persons living*. The comparative infrequency of *consumption*, in Wheeling, is worthy of special attention. Indeed, the death returns for the past thirteen years show conclusively that with the growth of the city, and the yearly increasing number of manufactories (and therefore a more sooty atmosphere), there has not been a corresponding increase in the number of deaths from consumption. For example, in the year

1854 there were.....	45 deaths	1865 there were.....	37 deaths
1855 " 	51 "	1866 " 	29 "
1856 " 	58 "	1867 " 	34 "
1861 " 	41 "	1868 " 	36 "
1862 " 	36 "	1869 " 	30 "
1863 " 	35 "	1870 " 	29 "
1864 " 	37 "		

In Wheeling, there is one death from consumption in every five hundred and fifty of the population; in New York, one death in every two hundred and fifty-three of the population; in London, one death in every three hundred and sixty-nine of the population; and the difference is scarcely less apparent when compared with the returns from New England manufacturing towns. In a word, notwithstanding the smoky, sulphurous atmosphere which constantly envelopes the city, the mortality from consumption is even less than occurs in the most salubrious country districts of the State.



PHYSICIANS.

THERE are in Wheeling nineteen regular physicians and surgeons. Besides these, there are three persons who practice Homœopathy—that “negation of *physics* as well as in medicine;” three so-called “Eclectics,” and one “Water Doctor.” There are also five dentists in the city, who are well skilled in their profession.

Dr. — Forsythe was probably among the first physicians who took up permanent residence in Wheeling, if not the *first doctor* who put out a shingle; and up to the year 1819, when the population of the town numbered 1,500, *ten* other medical men had come in to help possess the field. These were: Dr. Downey, Dr. Ralf, Dr. Zane, Dr. Martin Todd, Dr. Joshua Morton, Dr. John Eoff, Dr. D. J. H. Kiefer, Dr. J. W. Clemens, Dr. Townsend, and Dr. A. S. Todd, who is still living.

During the next thirty years, or up to 1850, several other gentlemen were added to the list, the majority of whom are still living.

The present *status* of the *regular profession* in Wheeling is of the most respectable character; and in no other city of the same size have all classes of people greater cause of thankful boasting in their supply of well educated, skillful and successful physicians. These gentlemen are generally *aucourant* in the different departments of their profession, and, at the same time, are expert and appreciative manipulators of the valuable implements and aids which science and art have placed at their command for the investigation and treatment of disease.

The only institutions set apart for professional improvement is the Wheeling and Ohio County Medical Society, which was established in 1868 to cover an unfortunate blank that had

previously existed for several years. This organization is auxiliary to the State Society, and is doing lasting good in the way of leveling *up* and leveling *down*, as the individual case requires.

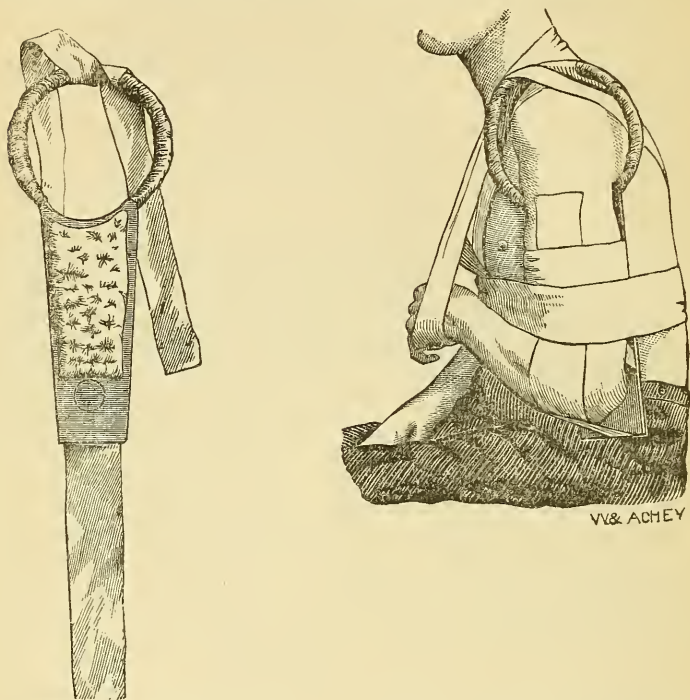
In Wheeling there are no specialists; all are general practitioners in the true sense of the term; but such distinction, no doubt, will come after a while.

Accidents requiring surgical aid are becoming more and more common; but considering the large number of persons who are daily exposed about the different railroads, in the numerous manufactories and machine shops, coal mines, and to like dangerous occupations, the number of such occurrences is, indeed, surprisingly small. The coal mines, in which hundreds of laborers are constantly employed, are well protected from the accumulation of suffocating gasses, by large aspirating *flues* or *headings* through the hill, and thus all danger from *dumps* is prevented; but occasionally serious injury results to miners from the falling of the arches, blasting, etc. The explosion of coal oil lamps is a prolific source of horrible death—principally from careless handling of dangerous kerosene. From this cause several deaths annually occur.

To Dr. R. W. Hazlett, of South Wheeling, I am indebted for permission to present the accompanying figures of a contribution to mechanical surgery: *A Splint with Ring*, for the treatment of fractures of the surgical and anatomical neck of the humerus and of the humerus itself, which in his practice has given greater satisfaction than any other form of appliance with which he is acquainted.

With slight modification—reducing the length of the splint so as to permit the elbow to fall below it to procure elevation of the arm—it may be used in the treatment of fractured acromion and coracoid. It may also be employed in cases of fracture of the clavicle, with the addition of the stuffed collar of the Fox apparatus on the sound shoulder, to which tapes are attached from the lower end of the splint. Dr. Hazlett claims for his new splint the following advantages: 1. Immediate adaptation. 2. Injured parts constantly exposed to view, thus admitting dressings and other applications for the reduction of inflammation, etc. 3. Perfect immobility of fracture, with arrest of muscular action. 4. Passive articular motion for prevention of ankylosis at any stage of union.

5. Freedom from pressure upon the axillary vessels. 6. Simplicity and economy of construction conjoined with easy adaptation.



I regret exceedingly that I am unable to present also a cut of another valuable surgical invention—an Interdental Splint—made twenty years ago by a Wheeling physician and surgeon, Dr. Robert H. Cummins. Until within the last few years, the treatment of fractures of the maxillary bones reflected but little credit upon the profession.

Dr. Cummins' splint was originally made of iron, but it may now be made of vulcanized India-rubber. In several particulars it resembles Dr. Covey's splint. Its horizontal surfaces are cup-shaped, with sufficient depth to receive the crowns of the teeth. It is kept in position by a mental compress, screw pad under the chin and rami of the jaw, and occipito-frontal bandage.

BIOGRAPHICAL RECORD.

"Life and death work hand in hand. If death lies at the door, it is always to proclaim the Gospel of resurrection."

DR. DANIEL JOHN HENRY KIEFER

Was born in Central Pennsylvania about the year 1795. He was of German parentage, received a liberal education, studied theology, and was ordained a minister in the German Lutheran Church. He was a fluent speaker, and highly and very justly esteemed as a minister. After a few years' engagement in the ministry, he determined to study medicine, and went into the office of Dr. Alexander Hiram Baker, of Baltimore, and graduated at the medical department of the University of Maryland.

He began practice at Somerset, Pa., and after remaining there a short while, removed to West Newton, Pa. From West Newton he came to Wheeling in 1837, where he soon enjoyed the confidence of all who made his acquaintance, and succeeded to a large and lucrative practice. After ten years' labor in Wheeling—having liberally provided for his family during his life—he died poor, of consumption, in 1847, aged 52 years.

DR. JAMES WOLF CLEMENS

Was born in Washington County, Pa., May 26, 1796, graduated at Washington College, Pa., under the presidency of Dr. Wylie, in 1818, and immediately went into the office of Dr. James Stevens, in the town of Washington, where he began the study of medicine. After two years' study with Dr. Stevens he opened an office at Florence, Washington County, and advertised for practice. Six months later he came to Wheeling, and at once entered upon a respectable business. In 1822 he graduated in medicine at the University of Pennsylvania, and returned to Wheeling, where he spent the remainder of his life, or twenty-six years, in the practice of his profession. He died of peritonitis, November 26, 1846, aged 50 years and 6 months.

His health had been gradually failing for a year preceding his death. Ten or fifteen days before his decease he went on a visit to his old home in Washington County to rest and recruit. He started back to Wheeling after several days' sojourn in the country, was overtaken on the way with sickness at Mrs. Beagle's, and there ended his life after two or three days' confinement.

Dr. Clemens had a large reputation, and, as a physician, occupied the front rank in the profession. He was the first physician in all this region of country to practice orthopædic surgery, and he could count many successful operations for relief of deformities of the feet, when such operations were regarded as novelties in the Eastern cities.

As an obstetrician, besides possessing consummate skill, his kind and gentle manner always made him a favorite with females, and

was the secret of his great popularity in this department of practice. But his beautiful character as a physician was never so well shown as during the fearful epidemic of cholera in 1832 and 1833, and he is still remembered by many of our older citizens for his devotion, his self-sacrificing labors to the sick and dying during these two never-to-be-forgotten years in the history of Wheeling.

He was fond of literature, and took a lively interest in all subjects of scientific importance. He superintended the opening of the Grave Creek Mound, examined and took casts of all the relics there exhumed, made a record of the same, and furnished a description of the skeletons found there buried for Morton's *Crania Americana*. His paper occupies an honorable place in that great American contribution to Archæological science.

As a graceful and effective speaker Dr. Clemens possessed not less remarkable powers. He was a warm advocate of temperance, and during the earliest agitation of the subject in this country, he was one of its warmest and most impressive advocates—a mighty captain of the Washingtonians in Wheeling. In private life his virtues were as bright and shining as his professional life was superior and a blessing to his race; and thus every position in life he filled he honored. He was both a Mason and Odd-Fellow, and for nine years a member of the City Council.

His widow is still living. His children were three sons and two daughters. The eldest son, Hon. Sherard Clemens, is now engaged in the practice of law in St. Louis, at which place, also, the second son, Dr. J. W. Clemens, Jr., resides, and occupies a professor's chair in one of the Medical Colleges of that city. For several years preceding his college engagement Dr. Clemens, Jr., was Health Officer of St. Louis, and made for himself many creditable marks in sanitary science. The third son, Dr. J. Breckenridge Clemens, after graduating at the medical department of the University of Pennsylvania, located at Easton, Pa., and began practice. He was a man of science, and was highly esteemed for his integrity and honor. He died a few years since, and his loss is yet severely felt by the citizens of Easton.

Dr. Clemens' father, William Clemens, was one of the pioneer settlers of Western Pennsylvania. His mother's name was Wolfe, the sister of the wife of the celebrated Judge Breckenridge, of Pennsylvania. It is related by the descendants of Judge Breckenridge that, when a young man, he made an accidental visit to Mr. Wolfe's house, and became at once enamored of Miss Wolfe, from witnessing her surprising agility in leaping and jumping, and that the wedding match was made before his departure from her home.

Of Dr. Clemens' daughters, the eldest, Miss Mary Cornelia, is dead; the other, Mrs. A. C. Jones, resides with her aged mother in Wheeling.

DR. JAMES BARRY TANNER

Was born in the city of Baltimore, August 26th, 1796. He received a liberal education, studied medicine, and graduated at the University of Maryland in 1823.

Immediately after receiving his degree he removed to Wheeling and commenced the practice of his profession. Within a year thereafter he married Miss Deborah Graham, a lady not less remarkable for her personal beauty, amiable and attractive manner, than for her superior intellectual accomplishments. She was his constant and faithful companion, proved a valuable help-mate in all the relations of life, and was spared to minister to him in the trying hours of suffering and death.

Dr. Tanner was identified with Wheeling for thirty-five years. He came when it did not cover one-fifth part of its present area, and not having, perhaps, one-tenth the number of its present population. He grew with its growth, was a prominent participant in all its struggles from a village to a prosperous city, and occupied many positions of trust and honor. He served the people many successive years in the City Councils, and was once or twice elected to the Mayoralty.

As a physician, Dr. Tanner ranked among the first in his profession, and worthily enjoyed the confidence of his wide circle of patrons. To the poor he was always ready to lend a listening ear and extend a ready hand, and when they were overtaken by sickness he was their faithful friend.

During the terrible epidemic of cholera in 1832 and 1833, he was unremitting in his services to the sick and dying, and with his heroic, self-sacrificing companions in toil, Drs. Clemens, Townsend, and others, he labored night and day, without regard to his own safety.

Dr. Tanner always had a *penchant* for military life. When but sixteen years of age he was made captain of artillery in the war of 1812, and gallantly fought in defense of his native city. He was promoted to the rank of major in the 52d regiment of Maryland militia. After his removal to Wheeling he was made captain of the 3d regiment of artillery of Virginia militia, and again promoted to the rank of major. His commanding person and the pride with which he commanded his company of "Greeks" is still remembered by many of the older citizens.

In his domestic relations Dr. Tanner was most happy. He returned the faithful devotions of his excellent wife, and was an affectionate father. He had but two children—a son and a daughter. The son, a promising youth, and the pride of his parents, died at the age of 17 years, of erysipelas of the head and face. The daughter, Loraine, is the accomplished wife of the Hon. A. I. Boreman, U. S. Senator from West Virginia, and resides at Parkersburg.

Dr. Tanner died on 27th of December, 1858, of inflammation of the bladder. He had suffered for many years from enlargement of the prostate gland, but was not confined to bed until a few weeks immediately preceding his death, during which short time he suffered a degree of pain rarely witnessed, in point of severity. In his last illness he was regularly attended by his warm personal friend, Dr. R. H. Cummins.

Dr. Tanner died lamented by the entire community, and his memory is yet held in affectionate remembrance by persons of all classes throughout the city and country round about.

DR. THOMAS TOWNSEND

Was a practising physician in Wheeling for fifteen or twenty years. He came from Ohio, and is supposed to have been a native of that State. He has no surviving relatives or friends in the city to give the particulars of the history of his early life. A knowledge of his character and peculiar habits is, however, possessed by many of our citizens, and from this source the following brief record is made:

Dr. Townsend was truly a self-made man, never having enjoyed the advantages of a collegiate education, neither was he a graduate in medicine. He had an in-born love for science, and by an indomitable energy and singleness of purpose, he mastered many abstruse subjects. In medicine and its collateral branches he was well informed. Botany, conchology, geology and mineralogy were his favorite and familiar studies. He was very decided, even obstinate in his opinions, firm in his convictions, and generally correct in his judgements. He had great professional pride; was a man of high sense of honor, and unquestioned integrity. He was always a *student*, and his habits in this respect made his life somewhat isolated. He had not a large circle of friends and patrons, and hence did not enjoy a lucrative practice; but his few friends were well chosen, and they were warm and appreciative in return.

He died in poverty on the 29th of March, 1851. The medical faculty of the city, feeling a sincere respect for his character, and profound sorrow at his loss, followed his remains to the grave, and paid the expenses of his funeral.

DR. JOHN EOFF

Was born in Shepherdstown, Virginia, October the 2d, 1789. He began the study of medicine in the office of Dr. Potter, of Wheeling, and subsequently attended medical lectures in Philadelphia.

From Philadelphia he returned to Wheeling and engaged in practice. He soon, however, concluded to change his residence, and removed to the Valley of the Kanawha. In 1816 he returned to Wheeling, where he spent the remainder of his life. After his return from Kanawha, he did not pay very great attention to his profession, which, up to that time, he had practised so successfully,

but engaged in other pursuits more to his liking; although, when called on, he never refused to lend his services to the sick.

Dr. Eoff accumulated wealth, reared a large family, and was esteemed one of the most respectable and useful citizens of Wheeling. He died suddenly of disease of the heart, on the 28th of January, 1859. His widow, though now over 70 years of age, is still able to walk a mile or two every day, when the state of the weather will permit, and she is not less remarkable for her mental activity. Her children, residents of Baltimore, Steubenville, Kanawha, and Wheeling, occupy the highest rank in society, and are thus worthily perpetuating the name of their honored father. Mrs. Eoff resides in Wheeling with her son, Mr. Beverly M. Eoff.

DR. E. A. WEHRMAN,

A learned and most skillful German physician and surgeon, came from Hanover to Wheeling about the year 1840. He died in 1851, greatly regretted by all who knew him. He was an accomplished *accoucher*; and, being entirely familiar with the literature of his native country, he was the first man in Wheeling to advocate and practice successfully the turning of the child by external manipulation, according, no doubt, to the precepts laid down by the great German accoucher and physician, Dr. Justus H. Wigand, of Hamburg, who published his new practice between the years 1812 and 1820, and enjoyed such general confidence that all Europe accepted, without question, whatever came from his pen.

SIMON PETER HULLIHEN

"Was born in Northumberland county, Pa., on the 10th day of December, 1810, and died in Wheeling March the 27th, 1857, of typhoid pneumonia. He was of Irish extraction, and descended from one of the oldest and most respectable families in that part of the State in which he was born.

"In his eighth or ninth year, young Hullihen met with a serious accident, by which both feet were so severely bruised that he was crippled for life. His early educational advantages were not great, being only such as were afforded by the district school. At a very early age, he manifested a love for medicine and surgery, and the diligence with which he pursued these studies was shown by his success in after life. He received the degree of Doctor of Medicine from the Washington Medical College, Baltimore, Md., and in 1832 commenced practice, combining dentistry with general surgery, at Canton, Stark county, Ohio. In 1835 he married and removed to Wheeling, and began his successful career. In 1845 he established a private infirmary, and several years later, assisted by Dr. M. H. Houston, formerly of this city, but now of Richmond, Va., and the Rt. Rev. Whelan, he succeeded in establishing the Wheeling Hospital, which has since been under the good management of the Sisters of St. Joseph.

"Dr. Hullihen was a member of the Ohio County Medical Society, and the author of several valuable papers connected with his specialty.

some of which were published in different medical journals. He was also the inventor of many really valuable instruments to surgeons and dentists. His death caused profound sorrow throughout the city, and the whole population turned out to attend his funeral. Resolutions of respect were adopted by the medical faculty of the city, by the members of the Hospital Association, by the City Councils, and by a public meeting of the citizens at the Court House. At the citizens' meeting it was resolved to erect a suitable monument to his memory. The monument was long ago erected, and, with the following inscription, it marks his resting place in Mt. Wood Cemetery: "Erected by the citizens of Wheeling to the memory of one who had so lived among them, that they mourned his death as a public calamity."

DR. JOSEPH THOBURN,

A citizen of Wheeling for twelve years, studied his profession in Ohio, and graduated at Starling Medical College, Columbus. He possessed more than ordinary intellectual power, was an industrious student, and deservedly occupied a high rank as a physician in this community. His manner was most happy, and he was rapidly rising in business when he abandoned its bright prospects for what he considered a higher duty. In 1861 he entered the army as surgeon of the 1st Regiment of Virginia Volunteers, and after a short service in this capacity, he was transferred from the medical staff to the rank of colonel of the same regiment. In this more military position he continued until the time of his death, and was regarded a leader of true bravery, of wise discretion, and of great boldness of execution. On the field, his presence invariably inspired his soldiers, and he gave the highest promise of greatness as a commander. He was killed at the battle of Cedar Creek, Va., October 19th, 1864.

In Wheeling, the greatest respect was paid his memory. His body laid in state, and was followed to the grave by an immense concourse of people, who sincerely lamented his untimely death.

Dr. Thoburn was born in the north of Ireland, and was brought to America by his parents when he was but three months old.

In 1853 he married the eldest daughter of Rev. Benj. Mitchell, of Mt. Pleasant, Ohio. His widow resides, at present, in Wheeling.

Dr. Thoburn died in his fortieth year, and has left a memory honorable as a citizen, as a physician, and as a military chieftain.

Since the above record was made, death has invaded the ranks of the Wheeling and Ohio County Medical Society, and taken from among us Dr. D. J. McGinnis, a poor stranger with a family, who came to this city about three years ago and engaged in the practice of medicine. He was born at Indianapolis, January 28th, 1836, and from that place, when he was eight or nine years of age, his parents removed to Hagerstown, Md. At twenty years of age, he was ordained in the ministry of the M. E. Church, and was a preacher in the Baltimore Conference. Several years ago he removed to West Virginia, and studied medicine in the office of Dr. Thomas Kennedy, of Grafton, and further prosecuted his studies, without graduating, at the University of New York. Prior to his removal to Wheeling, he was engaged in the practice of medicine in Preston county.

Dr. McGinnis was recognized by the Medical Faculty of Wheeling as a worthy member, and by the community, an honorable, upright man. He died of pulmonary tuberculosis, the 21st of December, 1870, sincerely lamented by all who knew him.

MEDICINES.



HERE are in the city three wholesale drug houses and thirteen prescription stores. The entire amount of drugs consumed annually is very considerable, and no doubt gradually increasing. Patent or proprietary medicines, however, according to the testimony of one of the largest wholesale dealers, have greatly lost favor with the masses during the last few years. The Wheeling wholesale drug market supplies a wide district of country in West Virginia and Eastern Ohio, and the *spirit* of therapeutics within its realm has very much altered and improved in ten years. Now, few orders, when compared with their frequency in former years, are received for calomel, jalap, scammony, rhubarb, ipecac, tartar emetic and other time-honored heroic remedies; but in their stead, come demands for tonics and stimulants—the preparations of iron, quinine, strychnia or these combined; and particularly for those of another class, iodide and bromide of potash, etc.

Within the last year or two, many really excellent pharmaceutical preparations have been introduced, some of which have become deservedly popular with physicians. The elegant elixirs and other beautiful preparations manufactured by John Wyeth & Brother, Philadelphia, have been found perfectly reliable, and are, therefore, worthy of the confidence they enjoy.

TOXICOLOGY.

Pathological conditions produced by poisonous agents are comparatively of rare occurrence. In the year 1868 there was one death from opium eating, and one attempt at suicide by swallowing a teacupful of venice turpentine into which the broken ends of a dozen or two *lucifer matches* were stirred. Under the influence of a prompt emetic, the remarkable mixture was gotten rid of, and the

patient suffered nothing except from slight irritation of the urinary passages for the next few days. Thus far this year, two attempts at self-destruction, by means of laudanum, have been discovered; and one case of poisoning in a child two years old, produced by Costar's cock-roach poison, has occurred. Fortunately the poison in the latter case was immediately gotten rid of by spontaneous vomiting; but serious sickness at the stomach and nervous sinking followed for the next few hours.

POISONOUS HAIR DYES, AND COSMETICS.

Prof. C. F. Chandler, in his report to the Board of Health of New York City on poisonous hair dyes, cosmetics, and kindred nostrums, says that fifteen out of sixteen preparations for the hair which he analyzed contained *lead* in the varying preparations, as shown in the following table:

I.—HAIR TONICS, WASHES, AND RESTORATIVES.

Grains of Lead in one Fluid Ounce.

Clark's Distilled Restorative for the Hair.....	0.11
Chevalier's Life for the Hair.....	1.02
Circassian Hair Rejuvenator.....	2.71
Ayer's Hair Vigor.....	2.89
Prof. Wood's Hair Restorative.....	3.08
O'Brien's Hair Restorer America.....	3.28
Gray's Celebrated Hair Restorative.....	3.39
Phalon's Vitalia.....	4.69
Ring's Vegetable Ambrosia.....	5.00
Allen's World's Hair Restorer.....	5.57
Knittel's Indian Hair Tonique.....	6.29
Hall's Vegetable Sicilian Hair Renewer.....	7.13
Dr. Tebbett's Physiological Hair Regenerator.....	7.44
Martha Washington's Hair Restorative.....	9.80
Singer's Hair Restorative.....	16.39

II.—LOTIONS OR WASHES FOR THE COMPLEXION.

Phalon's Paphean Lotion contains no injurious metals.

Burnett's Kalliston " " " "

Enamel of America " " " "

Email de Paris " " " "

Balm of a Thousand Flowers " " " "

Perry's Moth and Freckle Lotion, one fluid ounce of which contains mercury in solution, 2.67 grains; zinc, 0.99 grains, and therefore dangerous.

III.—ENAMELS FOR THE SKIN.

Balm of White Lilies contains no poisonous metal.

Dr. Bradford's Enamaline for the Complexion, holding 33.02 grains of oxide zinc in each fluid ounce.

Hagan's Magnolia Balm, holding in each fluid ounce 118.61 grains oxide zinc.

Laird's Bloom of Youth, holding in each fluid ounce 169 grains oxide zinc.

These are not really injurious,

Eugenie's Favorite, holding in each fluid ounce 140.52 grains carbonate of lead, *white lead*, containing 108.94 grains of metallic lead.

Phalon's Snow-White Enamel, holding in each fluid ounce 186.67 grains carbonate of lead, equivalent to metallic lead 146.38 grains lead.

Phalon's Snow-White Oriental Cream, holding lead in suspension 190.99 grains lead.

IV.—WHITE POWDERS FOR THE SKIN.

John Irvine's Compound Chinese Tablet of Alabaster.

Shand's Compound Chinese Tablet of Alabaster.

Superior Lily White, (X. Bazin, Philadelphia.)

Cascarilla de Caracoal de Persia.

The Original Tablet of Alabaster, or Lily White Cosmetic.

Bismuth Powder, for removing freckles, &c.

Lanel's Lily White and Rose Bloom.

Nothing injurious was detected in any one of these. They consist, either singly or mixed, of carbonate of lime, carbonate of magnesia, "French Chalk."

Prof. Chandler closes his report, as follows :

1. "With very few exceptions, the HAIR TONICS, WASHES AND RESTORATIVES contain lead in considerable quantities; that they owe their action to this metal, and that they are highly dangerous to the health of persons using them.

2. "With a single exception—Perry's Moth and Freckle Lotion—the lotions for the skin are free from lead and other injurious metals.

3. "That the ENAMELS are composed of either carbonate of lime, oxide of zinc, or carbonate of lead, suspended in water. The first two classes of enamels are comparatively harmless—as harmless as any other white dirt when plastered over the skin, to close the pores and prevent its healthy action. On the other hand, the enamels composed of carbonate of lead are highly dangerous, and their use is very certain to produce disastrous results to those who patronize them.

4. "The white powders for the skin are harmless, except in so far as their application may interfere with the healthy action of the skin."



OBSTETRICS.



WITH the exception of the occasional employment of the services of ignorant adventurous grannies—one of whom not long since administered chloroform to save her patient from the pains of labor—this branch of practice is in the hands of intelligent regular physicians.

Deliveries generally are easy, requiring but little necessitous interference; but they are, no doubt, becoming more and more difficult. For a part of the material presented in the following table, I am indebted to Dr. Todd, of Wheeling :

TABLE V.

BIRTHS, PRESENTATIONS, ETC.,—2,575 CASES.

	Dr. Todd.	Dr. Reeves	Total.
Whole number of cases.....	1584	991	2575
Males.....	780	530	1310
Females.....	794	461	1255
Primipari.....	.....	173	173
Vertex presentations.....	1474	939	2413
Face.....	3	2	5
Arm and shoulder.....	9	3	12
Breech.....	2	7	9
Knee.....	1	2	3
Feet.....	.....	1	1
Prolapse of cord.....	.....	2	2
Placenta prævia.....	4	3	7
Retained placenta.....	16	9	25
Hour glass contraction.....	5	2	7
Twins.....	16	5	21
Double placenta.....	11	4	15
Single placenta.....	5	1	6
Still born.....	32	13	45
Premature.....	85	37	122
Anencephalus monsters.....	5	2	7
Club foot.....	2	1	3
Hair lip.....	1	.....	1
Mother's mark.....	3	2	5
Hypospadias.....	.....	1	1

The annexed table exhibits the months of birth, time of day

and average duration of 135 of the 991* cases in which a more particular record was kept :

MONTHS OF BIRTHS, ETC., IN 135 CASES.

January	22	July.....	14
February.....	12	August.....	8
March.....	7	September.....	13
April.....	14	October.....	12
May.....	12	November.....	5
June.....	7	December.....	9

Average duration of labor 9.37 hours.

Delivered A. M., 71; delivered P. M., 64 cases.

The health of the female portion of the population is generally very good. Chronic uterine disorders, however, especially among child-bearing women, occupy a considerable share of professional attention. Too soon getting up from confinement, and other exposures in the puerperal state, are the causes of the trouble in the vast majority of cases. But in many instances, no doubt, the cause antedates the period of confinement, and begins with the early months of pregnancy, when concealment, even from the family physician, is so frequently practiced as a lady-like virtue. How many thousands of women are lost annually at confinement or during the puerperal period, because of failure to make known in time the complaints of pregnancy! The time must soon come, indeed, in all intelligent communities, when the period of pregnancy will require not less watchful care of the family physician than at confinement, and then the probability of life of child-bearing women will be increased.

* These cases occurred in country and village practice. Instrumental interference was resorted to in but *three* instances; once on account of eclampsia; once on account of narrow pelvis; and once on account of persistent *inertia*.

The two children who presented the face were born alive, after quick but severe labor. Three of the breech presentations occurred among the five twin births. In one case with the *first*; in two with *second* child. In the three arm-presentations (one of a twin labor) the children were delivered by version, and born dead.

In the management of the three cases of placenta prævia, *two* were delivered by version—children dead; in the remaining case the placenta was detached, and the labor then left to the unaided but vigorous efforts of nature—the child born alive. Mothers recovered.

In both cases of prolapsed funis, the cord was returned and retained, by position of the patient on face and knees; both children born living.

The oldest male parent, 70 years of age; the oldest female parent, 49 years of age.

THE SOCIAL EVIL.

“ The leprous distilment, whose effect
Holds such an enmity with blood of man,
That, swift as quicksilver, it courses through
The natural gates and alleys of the body—
Curdling, like eager droppings into milk,
The thin and wholesome blood.”



DESPITE the sneers of a pharasaical righteousness and prudery, this moral pestilence exists, and is fearfully on the increase all over the land. It is corruptibly touching the life-blood of the nation—destroying the strength and vigor of the youth of cities; attacking the aged and the young, the innocent and the defenseless; poisoning the husband and the wife, the son and the daughter, even to the third and fourth generation; blighting the infant in its mother's womb, and contaminating the milk that flows from her breast. It involves the health, the purity and peace of communities, and is, therefore, a subject of terrible importance, and presses itself upon the attention of philanthropists and statesmen, regardless of the scowls and scoffs of a mock-modesty that would cover up the ineradicable woes inflicted upon society by this avenging fiend!

Dr. Wm. L. Barret, Health Officer of St. Louis, in his admirable report for 1870, says:

“Since prostitution cannot be suppressed, it may and ought at least to be regulated. To its overthrow, the teachings of morality and virtue, the power of the Church, the stake and the gibbet have been tried in turn, and they have all failed to effect its abolition; but it is only unmanageable because concealed and unacknowledged.”

Dr. Sanger affirms “it is mere absurdity to assert that prostitution can ever be eradicated;” “and though our best feelings,” continues Dr. Barret, “may rise in rebellion at the thought, yet we have a solid dictum to deal with—an evil incident to and inseparable from all large cities—a corruption which is fermenting and spreading its contaminating influence throughout every civilized country.

How to shield female honor, or deplete the already-overcrowded ranks of frailty; how to protect health and lengthen life; how to reform the poor victims of circumstances, and too often of misplaced confidence—are among the questions at issue; and public and private interests demand their solution. Vice nestling in darkness and seclusion is doubly dangerous; but when dragged forth into the clear light of day is not half so formidable, because it can be seen and watched; and a malady that is threatening universal infection, destroying health, perverting happiness, entailing deformities in all shapes and death, demands scientific supervision and control.

“The darkness of night no longer conceals this vice from view; but it strides boldly through our most thronged and elegant thoroughfares, and there in the broad sunlight jostles the pure, the virtuous, and good.”

It being then wholly impossible to check prostitution, the question arises, how shall its evils be mitigated—what shall be done to diminish the ravages of venereal disease? This the future must answer.

“To shield from danger the trusting maiden, radiant with happiness, health, and beauty, who hopefully gives herself in the holy bonds of matrimony—to preserve the mother and child from the effects of latent and concealed poison—to preserve impulsive youth from the contamination of a loathsome malady, which, while it destroys health, too often blights life itself, should be a subject of serious concern to our legislators.

“Syphilis, which appeared in Europe in the latter part of the fifteenth century,* has spread with an extraordinary rapidity, and has now become frightful in its ravages. It exercises its power silently and secretly, its effects being inconceivably extensive. In protean and ever-changing forms it pervades every rank of society, and its tracks and features are everywhere visible. It is now a thoroughly established fact that a man who is free from every symptom of the disease, but whose blood is tainted with the poison, may contaminate his wife, and that the infection will not be preceded by any symptoms giving warning of the impending evil.”

While there is not a house of *public ill fame* in the city, there are several private brothels or places of assignation for the accommodation of libertines and their paramours. The number of regular prostitutes has been variously estimated, but probably does

* The Bible furnishes the first written assurance of syphilis, dating 1400 B. C. Moses was not only a profound legislator, but a most wise physiologist, and well understood the nature of the disease.—*See Leviticus, chap. xv.*

More than 500 years later, well did David exclaim, after his illicit commerce with Bathsheba, “There is no soundness in my flesh because of thine anger,” etc.—xxxviii *Psalms*.


not exceed seventy-five white, and about the same number of colored, persons of well-established character.* This, however, is a most difficult question to answer when inquired of any city, because of the unascertainable number of *clandestine prostitutes*—as Duchatalet calls them—who, while they make a trade of their persons, engage in various occupations, and by their singular industry *seem* to be virtuous, if not above suspicion; and from these down to the lowest class of wretched creatures (of which there are but six or eight in Wheeling)—who, besides the vices of their traffic, wallow in the streets and alleys, are drunken, constantly diseased, and spend at least three-fourths of their time in jail—there are several distinct classes of prostitutes. In my service at the county and city prison the abandoned creatures just referred to frequently present themselves for medical treatment; and they may there be seen glorying in their brutal estate. But the most lamentable example of female depravity I have ever witnessed, came under my observation a few months since—a child, thirteen and a half years of age, without the least sign of puberty, committed to prison for a term of thirty days for prostitution, suffering at the time a severe gonorrhœa! A low standard of home education, the desire to shine in fine dress, immoral books, passion, love and desertion, together with idleness—these, in all communities, are the most fruitful causes of prostitution; and when an unfortunate woman is impelled from either of the influences just recited to advertise herself, she is not long in finding a *particeps criminis*.

Besides prostitution there is another moral blight at present sweeping over cities, towns, villages, and throughout the rural districts—which is sapping the very foundations of manhood and yielding a rich and abundant harvest to thieving quacks in the larger cities. It is SELF-ABUSE; and Wheeling possesses her full share of the victims of this secret vice, upon many of whose sickly countenances are written the unmistakable evidences of their guilt, and the signs of coming greater weakness of both body and mind—and premature death! Surely parents and guardians, and all others who have control of boys, should look well to this subject.

* To an energetic member of the police force I am mainly indebted for these figures.

CRIMINAL ABORTION.

"Let me repeat it as a truth that should be kept in mind by all decent people, that men who advertise to treat secret diseases are, in general, villainous abortionists. There is scarcely an exception. The newspaper which comes daily into our homes, into the hands of our wives and daughters, carries the intelligence—not in plain terms, but under cover of removing obstructions, restoring the menses, and other expressions often indecent and obscene."—*Dr. Henry Gibbons.*

T cannot be said that Wheeling is free from the practice of this wide-spread, rapidly increasing sin of the times, which, notwithstanding the progress of civilization and the spread of religion, goes on from year to year with bolder step among all classes of society to the more and more abundant harvest of *fatal destruction* and death of guilty mothers. Surely the clergy all over the land should unite earnestly with honorable members of the medical profession in the effort to create in every community a sentiment against the enormities of this great evil—*high crime*—which, by married persons, is too often regarded as harmless and justifiable, either to diminish the number of participants in poverty, or for the more selfish purpose of insuring small families and fewer cares to the rich. Who will say that those—the majority—who resort to this practice of *fœticide*, and incur all the terrible dangers of the process, for the purpose of hiding the shame of *seduction* and *illegitimacy*, are the greatest sinners? If it were possible to recognize different degrees of criminality in this offending, and for which excuses might severally be offered, then the latter class would be entitled to greatest sympathy.

During the past year I have given this subject, for special reasons, most careful consideration, and from a larger personal experience, and additional information derived from the most trustworthy sources, including the confessions of several guilty parties—one of whom, to my own knowledge, came near losing her life

because of her sin—and the testimony of medical gentlemen of the most extensive practice and highest respectability in the profession, I think I am abundantly warranted in saying that while it has been found impossible to secure *precise data* concerning the frequency of the practice of criminal abortion in Wheeling, I have obtained sufficient information on the subject to satisfy me that it is now no uncommon resort, not only in the city, but throughout the country, under the excuses and for the purposes above named; and that because of the degree of allowance with which it is viewed by the public it is rapidly on the increase.

Frowns and censures may attempt to veil the truth by hiding from public view the frequency and terrible enormities of *feticide*, and by so doing assist in covering up the infamy of the miserable starvelings who have missed their calling, failed of success by honorable practice, and are now fattening from the butchery of unborn children, but they cannot conceal the criminality of the practice, nor diminish the value of human life.

Not long since a medical gentleman in this city was sent for in great haste to save from impending death a patient who had just returned from a visit to one of these scoundrels who carries on the trade of removing "obstructions," etc., and charges for his services in each case \$50. I am glad this villain does not disgrace the soil of West Virginia, because he is an old offender, and sharp enough to escape the clutches of the law.

In many instances women undertake their own cases, and now and then suffer the most direful consequences, which, if not resulting in immediate death, is frequently the cause of feeble health during the remainder of life. It is not always the case, however, that attempts to produce abortion are successful. Even the most desperate attempts sometimes entirely fail. I remember one female who acknowledged to me at the time of her natural confinement, her unsuccessful attempts to commit abortion. She declared that she had employed every method and means she could hear of, including, of course, quack medicines—had taken the *oleum sabina*, commencing with the dose of twenty drops and increased to teaspoonful doses three times a day, without producing any other effect than slight nausea.

Physicians can do much, indeed, towards establishing a wholesome public sentiment concerning this subject, and it is a duty they

owe to themselves, to society, and to humanity to combat "this great crime of American women" by making known its fearful dangers, and its sin in the eyes of the Creator, who has ordained that the love of offspring should be paramount to every other attribute in the female character—that a mother shall sacrifice her life for her child; and, without which love, woman is a monster!

Dr. Henry Gibbons, of California, in his annual address before the San Francisco Medical Society, delivered November the 9th, 1869—an address which is worthy of being printed in letters of gold—asks: "What better is the present Fœticide among American women than the Infanticide of the semi-barbarian Monguls? Does it not equally demonstrate the violation of a Divine law?—the subversion of a Divine instinct?—the destruction of the Divine image in the female heart? * * * *

"We have noted the powerful influence of the newspaper press in familiarizing the popular mind to the practice through the advertisement of abortionists; also the wanton perversion and destruction of maternal instinct, at the bidding of passion and pleasure and convenience, and sometimes, not so often, however, as might be imagined, under the pressure of poverty and want. But there is a deeper source than all this, in the tone and taste of society at large—respectable and virtuous society. The evil tendency begins just as soon as husbands and wives begin to make calculations on the inexpediency of increasing their family. Generally speaking, the poor give themselves little trouble about such matters. They may think, but they do not care. They may neglect their children after birth—they may suffer them to die from carelessness; but they have no dread of offspring. They do not esteem it a curse to have children. On the other hand, not only in fashionable life, but in the great middle stratum of American society most favorable to moral culture, it is customary to make calculations as to the number of children that shall be born, just as servants or horses are made subjects of calculation. Then come restraint and prevention. In their little coteries women vote it beastly to have a large family. A popular sentiment grows up in this way, which becomes the law of the household. As the means of prevention often fail, thousands of children are conceived and born under protest, as it were. The natural instinct is blunted, and a long step is taken unwarily in the direction of fœticide—if, indeed, fœticide be not attempted by drugs or violent exercise.

"There are few married people who have dwelt in large cities but will acknowledge the truth of this picture. I wish to make it broad enough to take in many excellent persons who declaim against fœticide with holy horror, and yet overlook the little beginnings: as men are wont to denounce drunkenness whilst they follow the

practice of drinking a little, the only path by which drunkenness is reached.

"Let me cite an instance in which even polite literature has been inveigled into this rebellion against humanity. One of the sweetest of New England's poets, and one of the purest and best of men, who would shrink with horror from such an accusation, has unwittingly fostered the vicious sentiment in his much admired poem of Maud Muller :

"She wedded a man unlearned and poor,
"And many children played 'round her door."

"To enhance the impression, a large family of little ones is pictured in the illustration, as if emblematic of misfortune and disgrace. In truth, the moral of the entire poem is pernicious.

"Do not understand me to inculcate that it is not advisable under any circumstances to endeavor to limit the size of a family. What I do maintain is that it were far better, as in the marriage selection, to throw off restraint and leave the result to impulse and accident, than to make calculations and efforts which lower the maternal instinct and nurture the elements of fœticide.

"In all times and in all nations, the mother of a large family has been crowned with honors. The names of matrons who have given to their country a numerous progeny have been written in letters of gold on the page of history. In many cases states have bestowed on them substantial favors. What a precious example is presented by the Queen of England, as a rebuke to such American women as are induced by fashion and pride and perverted taste to regard the parental relation as burdensome and odious !

"An inquiry, curious and interesting to the physiological student, arises in this connection : whether the child commencing its embryonic existence under restraint and apprehension is liable to be deficient in vigor, and whether, during the uterine development, the vitality of the fœtus is lowered by the aversion and antipathy of the mother. It can scarcely be doubted that unsuccessful attempts at abortion may inflict serious injury on the offspring—possibly to the production of cripples and idiots. If the ichneumon's egg be thus deposited in the embryo—if the children of dread and sorrow thus avenge themselves in the womb on the anti-maternal hate of the mother, then is another curse on posterity added to those already incident to the progress of civilization and luxurious refinement : and the rich and the proud, the noble and the mighty of the hour, must hand over the destinies of the race to the humble sons and daughters of toil.

"Among all nations there is more or less dread of a redundant population. Different means are adopted to prevent it. Infanticide is the Mongolian method—sharp, practical, decisive. The American system is fœticide. Across the Atlantic, calculation, late marriages, and "prudential restraints" are in vogue. British and

European journals are vexed with the problem. Good people talk of the sin of bringing children into the world before the means of supporting them are secured. Therefore people who have means will not marry, and married people who have means will not bear children—if they can help it; and for the purpose of helping it they adopt “prudential restraints,” nearly equivalent to the plan of a personage who lived in the land of Canaan many years ago, and whose name has been handed down to the present time without honor.

“In some points of view, and under some circumstances, it seems desirable that there should be a small family. But the purpose is liable to involve serious penalties—nothing less than prostitution, licentiousness and disease. Late marriages have the same effects. Take a lesson from France. At the commencement of the present century the average number of children in a family in Paris was four and in the rest of France five. Now there are but two in Paris and three in France. The official lists drawn up for conscription show that the number of young men between twenty and twenty-one years of age does not increase: and the proportion of healthy and vigorous subjects who constitute the strength of the empire tends more and more to decline. We have it on good authority that the mean stature of the French nation has diminished.

“The medical journals and associations of France have, within a few years past, been much engrossed with two topics; one, the excessive infant mortality, the other, the increasing prevalence of venereal disease. It would not be surprising if cold calculations of matrimony, and “prudential restraints,” and the loosening of maternal ties, should lower the average vitality of infants and stamp the nation with degeneracy.

“To increase and multiply appears to be the law of God in regard to peoples, as it is the law of nature. In spite of malthusian speculations, men estimate the prosperity of states and nations by the increase of population: and individual poverty, unless it amount to indigence, is not incompatible with national strength. Wherever our race has multiplied abundantly, the elements of power and greatness have been developed with their teeming numbers; and semi-barbarian though they may have been, they have wrested the sceptre from the empire of luxury.

“Let me put the proposition in another form. Rapid increase denotes constitutional health and physical vigor. If the race or original stock be good, a nation so increasing accumulates all the material and psychical capabilities within the range of human nature. On the other hand, paucity of births, whether from aversion and restraint, or from starving indigence, implies a degenerate and decaying race. With aversion and restraint are associated pestilence and disease.

“Look at the Israelites. Never did there exist a race so eminently

parental through so many generations of history. Dating from the twelve sons of Jacob, love of offspring has been characteristic of the Jewish people. In the bondage of Egypt, in the starvation of the wilderness, in downfall and dispersion and persecution, the Jewish woman has ever been faithful to the maternal instinct. And now, after eighteen centuries of homelessness and exile, and in spite of evils essential to the restriction of marriage within the race, the children of Israel are found in all parts of the civilized world, enjoying wealth, power and influence, and reflecting honor on their patriarchal ancestry.

“Look at the Irish. Ground down for long centuries between the upper and nether millstones of State and Church, and decimated again and again by pestilence and famine, the population of Ireland has grown without restraint. It has furnished to Britain the right arm of her military and naval power, and supplied swarms of colonists to the western world. That Irish mothers have no dread of offspring, has preserved the vigor and energy of the race, and enabled it to recruit, with bone and sinew at least, the ranks of American population, threatened with depletion by the great crime of American women.”

Of the children who are born under the curse of illegitimacy, the large majority perish during the first weeks of life from want of proper care, and perhaps from over doses of cordials, soothing syrups, etc., in the hands of *very* kind nurses; and after death they are not always honored with a *certificate* in due form, but sometimes get a most ignoble burial or baptism.

Foundlings are provided for at county expense, and the number of these annually does not exceed two or three.



VACCINATION.



THE neglect of Vaccination is a great and growing evil, and scarcely a year passes that there are not at least several cases of smallpox reported in the city; and, true to its original medium of introduction to the continent of North America, the loathsome contagion is generally introduced by negroes who come either from Cincinnati or Pittsburgh. During the winter and spring of 1868 and 1869 thirteen persons, principally negroes, died of smallpox in Wheeling.

The office of the State Vaccine Agency is in Wheeling, and from this depot *crusts* or "scabs" are received and sent out on demand. These are no doubt collected with care, but how far, really, the *virus* thus procured and distributed is *protective* cannot be told. In the majority of instances it will make a *sore arm*—but what kind of a sore arm is quite another question. The operation is too often entrusted to uneducated hands both in city and country, and hence the frequency of failure of vaccination to give protection. No circular of instructions can supply professional skill.

Dr. Wm. C. Roberts, Vice President of the New York Academy of Medicine, in a paper on Vaccination recently published in the New York "Medical Gazette," says:

"The fact is that there is a great deal too much smallpox about after vaccination, and bad smallpox, too; and that the public confidence is naturally very much shaken in its efficiency and safety."

Dr. Barret, Health Officer of St. Louis, in his Report, to which reference has been made on a previous page, says:

"The great cause which operates most strongly to prevent frequent vaccination, and consequently to impair the immunity derived from it, is the popular dread of impure virus, and though this danger has doubtless been much exaggerated, it is nevertheless

true that virus comparatively worthless, or of questionable quality, does no doubt find its way into common use. * * *
Often, when its purity is unquestionable, age has destroyed its virtue. Hence, too, the frequent failure and the great want of confidence in it among the people, as a preventive."

Dr. T. M. Logan, visiting physician to the Smallpox Hospital at Sacramento, and President of the Medical Society of the State of California, in his excellent "Medical History of the Year 1868 in California," says concerning the extensive prevalence of smallpox :

"I have already alluded to its primary and chief cause—inattention to vaccination. * * * A second cause is imperfect vaccination. This may be produced by a variety of causes. Bad vaccination, as it prevails at present, is almost always directly dependent on its careless employment of improperly preserved dry lymph, and indirectly associated with irregularity of inspection." *

But notwithstanding these and other causes of failure of vaccination, "No such specific boon," says Dr. Roberts, "has ever been vouchsafed by the Creator to suffering humanity. It has saved, and will hereafter save, millions from a loathsome disease, which makes the victim terrible and repulsive to his nearest and dearest friends, and entails death, disfigurement, blindness and dyscrasia. And yet it is wonderful with what apathy, contempt and objection this simple and—properly employed—sure preventive is regarded by those to whom it is so freely offered."

Dr. William Pepper, of Philadelphia, in his most valuable paper on Vaccination in the "American Journal of the Medical Sciences," arrives at several distinct and decided conclusions, which in substance have been summed up by the Boston "Journal of Chemistry" as follows :

1. Vaccination appears to furnish almost complete protection against either varioloid or variola, during the first six years of life.
2. In subjects not vaccinated the greatest susceptibility to the variolous poison seems to be during the first two years of life, at which time the form of the disease is very apt to be confluent, and in a large proportion of cases fatal. The same tendency to assume the grave form of true confluent variola in unprotected subjects may be seen, though to a less degree, at all ages.
3. When, owing to any cause, whether from possible inertness of virus, imperfect insertion, or idiosyncrasy on the part of the

* Dr. Sanderson, in Public Health Report, 1861.

subject, the vaccination fails, the operation should be repeated at short intervals, varying the virus and perhaps the mode of insertion until success is obtained, or all danger of exposure to contagion ceases.

4. In very many cases, however successfully vaccination may have been performed, its protective power becomes exhausted after a number of years, although there is very little risk when vaccination has preceded the exposure by so short a period as two years.

5. When the protective power of vaccination has been exhausted, the subject may contract any form of variolous disease.

6. Notwithstanding this possibility, the chances are very much more in favor of an attack of varioloid or a mild form of variola, when the subject has been vaccinated successfully, no matter how long before, than if this operation had not been performed.

7. Although the tables furnish meagre evidence of a positive kind as to the absolute power of vaccination to protect against death from variola, they furnish strong negative evidence in its favor.

8. If vaccination is performed during the incubation of variola, at such a time that the vaccine eruption appears before the variolous eruption, the latter will be modified, and, in the vast majority of cases, favorably.

Vaccination, to be successful in the largest possible degree in stamping out smallpox, should be *compulsory*, and none allowed to perform the operation except competent physicians. The protection at present afforded by the State is incomplete for the reason that it merely provides for a supply of vaccine which is to be distributed on application to any and every body, and hence the frequent failures, even with genuine active virus.

Of 1,924 children examined in the public schools of Wheeling, in March, 1869, with a view of determining the amount of protection against smallpox by vaccination, the following was the result: Males, 1,104; females, 820; had smallpox, 54; presented good marks, and therefore presumed to be protected, 1,707; unprotected as shown by the absence of mark, 163.

EPIDEMICS.



Y the assistance of several of the oldest physicians in the city, the following schedule of prevailing epidemic and endemic diseases, from the fall of 1832 to the present, is made out:

CHOLERA.

The first case of Asiatic cholera made its appearance in Wheeling late in the fall of 1832. Several cases occurred in quick succession, all of which proved fatal.

The 16th of May, 1833, the disease reappeared, and by the first of June, so abundant had been the harvest of death in the various sections of the city, that hundreds of people were fleeing in search of a place of safety from the ravages of the terrible devastator, and many of these were stricken down by the wayside. Besides the general prevalence of simple choleraic diarrhœa, two hundred and eighty-nine cases advanced to the latter stages of the disease. Of this number one hundred and twenty-five were males, one hundred and twenty-three females, and forty-one children of both sexes. The total number of deaths to the 25th of June—the date of the last case reported to the Board of Health—was one hundred and fifty-three: white males, fifty-nine; females, fifty-five; children, twenty-eight; colored and slave, eleven.

In the districts where the disease was most virulent, viz.: from the old market-house, and back to Fourth and Fifth streets, including Market square, and on Market and Main streets, between Jefferson and Adams (the most elevated and before considered the most healthy location in the city), the mortality bore a proportion to the population of probably twenty per cent. From Union street to Wheeling creek, on the west side of Main and Water streets, *no case* of the disease occurred.

“On Saturday morning, the 8th of June, the neighboring village of Bridgeport was attacked. The inhabitants were seized with a sudden panic and consternation, and a general flight was the con-

sequence. Early in the afternoon information was received here that several deaths had already occurred there, and that the sick and dying were without attendance or medical aid. One of our physicians and a clergyman immediately crossed over to render assistance. On their return at night they reported the scene of distress as beyond any they had ever witnessed—*seven* dead and *ten* in a state of collapse, and many others in the incipient stage of the disease. Sunday morning other physicians, with several benevolent citizens, went to the aid of the sufferers. They found fourteen dead, none of which had been laid out. In one house they found a man and his wife both dead in the same bed.

“Of a population of two hundred not more than fifty were left, and of these there were not well enough to afford aid to one-half of the sick and dying. In three days twenty-two died of the disease.”*

The second cholera epidemic began in 1849, and spread through several years, or up to 1854. The attacks were not very numerous at any particular season, but during the entire cholera period a large number of deaths occurred from the disease. At the same time bowel complaints were of great frequency in the country districts; and the same condition or predisposition among country people was as distinctly marked in 1832 and 1833. In a country district, on the line of the Baltimore railroad, six miles from Wheeling, during its last visitation, cholera made great havoc, particularly among the laborers on the railroad, which was then in process of construction. One entire section of the work had to be abandoned for several weeks, on account of the prevalence and fatality of the disease among the workmen.

Occasional cases have since occurred, but owing to their infrequency and mildness of character, the disease was called cholera morbus.

During the last cholera period, malignant pustule or carbuncle, whitlow, and other ill-conditioned sub-cellular inflammations, erysipelas, puerperal fever, scarlet fever, and enteric or typhoid fever were also prevalent.

Since cholera first made its appearance at Jessore, in India, few portions of the civilized world have escaped its ravages.

CHOLERA INFANTUM

Is the faithful summer visitant of all cities and large towns, and constitutes the chief source of the mortality among children during the period of first dentition. Its prevalence is a most unerring sanitary monitor, and where the little ones perish, there exists also danger to the health of the surrounding population.

* Wheeling “Times,” June 12, 1833. See also admirable paper in the Richmond Medical Journal, vol. 1, page 91, which faithfully describes the visitations of cholera in Wheeling, by Dr. M. H. Houston, formerly of Wheeling, but now of Richmond, Virginia.

DYSENTERY.

The most extensive and fatal epidemic visitation of this disease in West Virginia occurred during the summer and fall of the years 1851, 1852 and 1853. In the counties of Randolph, Barbour, Upshur, Harrison, Taylor, Preston, Marion and Monongalia, the mortality in many neighborhoods was positively appalling, and without precedent in the previous history of the disease in those districts. In the white-oak or clayey soil localities, its ravages were conspicuously displayed.

In 1863 and 1864 there was a feeble epidemic visitation; since then there has been no general prevalence of the disease, though every year has brought around a greater or less number of isolated cases—some of them exceedingly mild in character, others rapidly fatal. The same difference of severity was frequently observed even in the same family, during the malignant and generally fatal epidemic of 1851, '52 and '53.

Concerning the mooted question of the contagiousness of dysentery, I am well assured—leaving out entirely the difference of opinion among medical men on the subject—no amount of reasoning could convince the people who have witnessed the prevalence of the disease, its fearful spread, and tendency to death, that it is not actively contagious—as surely so as scarlet fever or measles.

SCARLET FEVER AND DIPHTHERIA.

Though so dissimilar in their nature and general character, these twin angels of death—these insatiable destroyers of the happiness and hopes of families—often go hand-in-hand on their avenging mission; and where, indeed, is there a home in which they have not left their foot-prints and their cold shadows!

The simple mention of either name produces a sensation of chilliness and dread, and sends across the darkened mirror of recollection scenes of woe and wretchedness, which are inscribed in such distinguished characters of terror and desolation that they cannot be contemplated, even by those who are familiar with spectacles of human misery, without a heartfelt emotion. These rapacious destroyers feed principally upon the youth—the sensitive plants of humanity—the little souls that so closely connect earth and heaven; and their presence in every community inspires an unutterable gloom.

Scarlet Fever has many times scourged Wheeling since 1836, from which date, with tolerable certainty, I have been able to trace its fatal steppings in the community.

From 1836 to 1838 the city was at no time entirely free from the disease, and so malignant was its character during those years, that in numerous instances death occurred in the formative stage. The next fearful and prolonged visitation occurred during and between the years 1849 and 1854; the next cyclic recurrence between the years 1861 and 1864; and from the last mentioned date to the present, scarcely a year has passed without the occurrence of a greater or less number of cases of the disease.

During the fall of 1869 an unusual number of cases occurred, but they were of very mild character. At the same time, the disease was generally prevalent throughout the State—mild and manageable in some neighborhoods, and terribly fatal in others.

I believe it is the opinion of all observant and experienced physicians of West Virginia, that, as a rule, the mountainous districts, including their narrow valleys, are most frequently and fatally visited by scarlet fever. For example: the Randolph Valley, situated between Cheat Mountain and Laurel Hill, the highest large district of level land in the State—a country in sight of almost eternal snows and ice in the adjacent gorges of the Alleghany range—has been visited several times, within my knowledge, by scarlet fever of such malignant and fatal type that scarcely any escaped death who were attacked.

At present, January, 1871, the disease is prevailing in various portions of the State with very different degrees of severity. In several neighborhoods of Preston county, especially in the vicinity of Cranberry Summit—one of the highest points of the line of the Baltimore and Ohio railroad—the disease has been severe, and is yet yielding a large harvest of fatal fruits.

There is probably no disease which ends fatally in so many different ways as scarlet fever—no disease in which, in its very beginning, death may more suddenly and unexpectedly occur. Sometimes in the very midst of artless merriment and play, the patient is convulsed, struggles a moment, and is dead! In other cases the disease is so mild that its subjects are not sufficiently sick to be confined to the house, much less to the bed. Again, the attack may be, seemingly, of moderate severity, and yet the patient is cut off by closure of the throat from the intensity of the inflammation, or from exhaustion and sudden yielding of the vital powers.

Even should the beginning of convalescence be reached, there are still numerous dangers in the way to health—dropsy, abscesses about the neck, etc., which, if they do not fatally interrupt the

process of recovery, may scar and cripple, and send the patient out into the world blind and deaf for life. How many such unfortunate relics may there at all times be found in asylums for the blind and deaf—how many others of the same class are there scattered all over the land!

The contagious character of the disease is well understood. Indeed, I shall never forget several most lamentable examples of its contagiousness which have occurred in my own experience.

DIPHTHERIA, because of its frequency and fatality, has a record in Wheeling and in every county of West Virginia, scarcely less calamitous than that which has been written for scarlatina.

Under different names—"putrid sore throat," "malignant ulcerous sore throat," etc.—this disease, no doubt, prevailed thirty-five or forty years ago; although it was not distinctly recognized by the profession until about the year 1857, when it first became generally prevalent. This epidemic covered a period of three or four years, carrying consternation with it according to its fatality, and reached its acme, both of extent and fatality, in 1859. During this visitation many examples of *cutaneous diphtheria* were presented—the eyes and other unusual parts frequently involved.

Dr. William J. Bates, of Wheeling, first met with diphtheria in 1844. He says on this subject: "Three children, residing below the city, on the river bank, died under my care, with what I am now convinced was diphtheria. In these cases the disorder was insidious in its approach, and fearfully rapid in its progress—fever, pain in the head and back (the last especially severe), delirium, sore throat, and lymphic deposit also on the vulva and about the anus. Death took place in from three to five days from the outset of the disease."

He saw the disease again in 1857. "Three children were attacked with well-marked diphtheria following measles, and died of the croupal form of the disease."

Dr. Robert H. Cummins, of Wheeling, first met with diphtheria in his practice in 1848. Several cases were under his charge, all of which proved fatal. In one of these the disease extended to the larynx and trachea. In 1860 Wheeling was severely visited by the disease. During its prevalence in Barbour county, in 1858, I saw three fatal cases in which the disease attacked the feet and ankles, without any well-marked exudative inflammation of the fauces. I have also met with two cases of vaginal diphtheria; and in one instance observed the pudenda of a little girl covered with the characteristic exudation, without any apparent trouble in the throat. This patient recovered.

Paralysis was by no means infrequent, both as an accompaniment and sequel of diphtheria—*e. g.*, the difficulty in swallowing liquids, and the nasal tone of the voice during the course of the disease; and after the beginning of convalescence, weakness of

vision, or absolute loss of sight—loss of power to use the limbs. The following case, which came under my observation in 1862, is exactly in point: Mr. R. F——, twenty years of age, suffered a severe attack of diphtheria, and after so far recovering as to be able to quit his room and go out of doors, suddenly became weak-sighted—unable to read very *large print*, and during the next twenty-four hours lost the use of his lower limbs. He was put upon the use of large doses of tinct. ferri chloridi, with quinine, tinct. quassia, cinchonæ, and nux vomica, under which treatment, aided by galvanism, he recovered in twelve months.

I have known several cases in which, after convalescence had continued for two or three weeks, paralysis of the velum palati supervened and was most rebellious to treatment. I think my experience warrants me in believing, that while by far the largest number of the subjects of diphtheria are children, diphtheritic locomotor paralysis occurs with greatest frequency in patients above fifteen years of age; and that among this class also do we find the greatest number of cases of impaired or defective vision.

There are few physicians of experience in the management of diphtheria, I apprehend, who have not witnessed the occurrence of sudden death by syncope upon very slight physical exertion. There is great danger of such a termination even after convalescence is reached, and all exudation has disappeared from the throat.

Death produced by the extension of the false membrane to the larynx, from croup, has happily been rare in my experience. I have never known but one patient to recover after the larynx had become thus involved—a little girl at Fairmont, three years of age. Death by asthenia is the common mode, and it may take place from four to five days, or not until from four to five weeks from the date of the attack.

The disease has prevailed at all seasons, and appeared to be equally independent of all atmospheric conditions; and its fatality has greatly varied in different places, without any reason having been discovered to account for such difference in severity.

That it is more or less actively contagious, there can, I think, be no reasonable doubt; and in proof of this character of the disease, I could, if it were necessary, produce many carefully collected and positive examples. In ill-ventilated rooms diphtheria produces an atmosphere so intensely infectious sometimes, as to strike down all who come within its poisonous influence. Hence the absolute importance of thorough and constant dilution with fresh air.

Very often diphtheria and scarlet fever prevail simultaneously. Indeed, I have seen both diseases in the same family at the same time; and, once or twice, on such occasions, have been able to recognize both diseases afflicting the patient at the same time.

Ordinarily the diagnosis of diphtheria is not difficult. It rests upon the existence of a false membrane in the fauces which has a *tendency to spread beyond the limits of the pharynx* into its various

outlets; its grave and peculiar constitutional symptoms; its singular chronicity; its slow and uncertain convalescence; its remarkable sequelæ; its tendency to death.

But notwithstanding the great and irreconcilable differences which separate the specific character of diphtheria from all other diseases, mistakes in diagnosis are continually being made. The diseases with which it may be confounded are sthenic pharyngitis, tonsillitis, muget, aphthous inflammation of the mouth, erysipelas, croup, and scarlet fever.

The following clear antithetical summary of the differential diagnosis of diphtheria and the diseases with which it is liable to be confounded, is copied from Professor E. S. Gaillard's invaluable essay on diphtheria, published in 1866 in the "Richmond Medical Journal" (now "Richmond and Louisville Medical Journal"). This little work of Professor Gaillard may be had, I believe, in separate binding, and is worth all the other books on the same subject with which I am acquainted:

Diphtheria.

Disease of the blood; a toxæmia; a constitutional disease, with local manifestations.
 Blood primarily affected; sometimes there are no local manifestations
 First exhibits itself in the fauces, locally.
 Commences always above the rima glottidis.
 Does not extend below the rima glottidis unless complicated with croup.
 Asthenic disease; constitutional symptoms primary; local symptoms secondary.
 Depression often manifested without dyspnœa.
 Contagious.
 Not peculiar to any age.
 Respiration not affected, unless the disease extends downwards; dyspnœa not a prominent symptom.
 No cough, unless croup supervenes.
 The membranous exudation of fibrin always commences above the rima glottidis.
 Exudation only extends below as a complication.
 Occasionally there is a cutaneous eruption.
 Epidemic chiefly, and seldom sporadic.
 Swelling of the lymphatic glands behind the jaw frequently occurs.
 Duration one to three weeks, with sequelæ.
 Exudation fibrinous.

Croup.

Not a disease of the blood; a local disease with constitutional manifestations.
 Blood, if at all, affected secondarily; local manifestations invariable.
 Locally, first exhibits itself in the trachea.
 Commences always below the rima glottidis
 Never extends above the rima glottidis.
 Sthenic disease; local symptoms primary, and constitutional symptoms secondary.
 Depression not often manifested before dyspnœa.
 Not contagious.
 Peculiar to infancy and childhood.
 Impaired and difficult respiration always a prominent symptom; often the chief symptom.
 Cough almost invariably present.
 The membranous exudation of albumen always commences below the rima glottidis.
 Exudation never extends above.
 There is never a cutaneous eruption.
 Sporadic and never epidemic
 Swelling of the lymphatic glands behind the jaw never occurs.
 Duration never beyond the 11th day, (Crigîé;) no sequelæ.
 Exudation albuminous.

Diphtheria.

Dyspnœa rare, and, when present, uniform.
Dyspnœa not produced or increased by deglutition.
Invades at all hours.
Not caused by cold and dampness.

Prognosis generally good; mortality slight.

Antiphlogistic treatment injurious.
Tracheotomy contraindicated and generally forbidden; no constitutional resiliency.

Sequelæ; paralysis, strabismus, amaurosis, etc.

Fœtor of the breath constant and great.
"Dissolution of the blood;" loss of its coagulating power.

Constitutional symptoms precede the local.

Membranous exudation always present (as a rule) and always seen; present as the rule.

Exudation thick, buff colored; coriaceous.

Membrane renewed as the rule.

Death, when disease is uncomplicated, from asthenia.

Sound of the cough sonorous and moist.

Convalescence slow, unreliable and complicated with the sequelæ of the disease; interrupted.

Diphtheria.

One attack produces no immunity whatever from succeeding attacks.
One attack not influencing the severity of the next; if at all, generally increases the severity of the second, third or fourth attack.

Heat, at the outset, very moderate, and subsides quickly.

Cutaneous eruption present, as the exception; of a uniform erythematous redness; without a punctated appearance; appearing in patches.

Exudation appears in various localities; present as the rule.

Tongue coated white or yellow; when this disappears, tongue is not red and glossy; papillæ not elevated.

Convalescence slow, unreliable, complicated and interrupted; bears no proportion, in length, to severity of the throat lesions; trouble chiefly constitutional.

Croup.

Dyspnœa common and invariably spasmodic.

Dyspnœa frequently caused and increased by deglutition.

Invades chiefly at night.

Generally caused by cold and dampness.

Prognosis grave; mortality severe.

Antiphlogistic treatment curative.

Tracheotomy indicated and advised; constitutional resiliency very decided.

No sequelæ.

Fœtor of the breath generally absent.
"Dissolution of the blood" never seen; increase of its coagulating power.

Local symptoms precede the constitutional.

Membranous exudation seldom present, and never seen; present as the exception.

Exudation thin; not buff colored; not coriaceous.

Membrane renewed as the exception.

Death from apnœa.

Sound of the cough sonorous and metallic.

Convalescence easy and uniform; no sequelæ; uninterrupted.

Scarlet Fever.

One attack produces almost a complete immunity from succeeding attacks.

One attack always influencing the severity of the next; second attack seldom seen, and mild; third hardly known.

Heat, at the outset, very intense and subsides slowly.

Cutaneous eruption present, as the rule; not of a uniform erythematous redness; with a punctated appearance; not appearing in patches.

Exudation appears only in one locality; present as the exception.

Coat very light and soon disappears; tongue is then red and glossy; papillæ elevated; "strawberry tongue."

Convalescence (when the throat has not ulcerated) usually continuous and uniform; bears a marked proportion in length to severity of the throat lesions; trouble chiefly local.

Diphtheria.

Sequels—paralysis, and very seldom anasarca.
 Arthritis unknown; pericarditis never occurring; chorea never seen.
 Laryngitis frequent; "causes three-fourths of the deaths."
 Ulceration and sloughing of the mucous surfaces not seen.
 Creates a susceptibility to a second attack.
 Albuminuria a primary symptom; occurs in the early stages.
 In aggravated cases, no cerebral disturbance; no delirium, no stupor, no coma; intelligence and consciousness unimpaired.
 Not peculiar to any age.
 Desquamation very slight always.
 Deafness not caused by it.
 Strumous ulcers, boils, swelling of the cervical glands, inflammation of the eyes, diseases of the scalp, etc., never seen as the sequels of an attack.

Scarlet Fever.

Sequels—anasarca and very seldom paralysis
 Arthritis often seen; pericarditis often occurring; chorea often seen.
 Laryngitis not seen; does not cause any deaths.
 Ulceration and sloughing of the mucous surfaces often seen
 Creates an exemption, usually, from a second attack.
 Albuminuria a secondary symptom; occurs in the latter stages.
 In aggravated cases, much cerebral disturbance; delirium, stupor and coma not uncommon; intelligence and consciousness often impaired.
 Chiefly peculiar to children.
 Desquamation extensive and general.
 Deafness a frequent sequel.
 Strumous ulcers, boils, swelling of the cervical glands, inflammation of the eyes; diseases of the scalp, etc., often seen as the sequels of an attack.

INFLUENZA, PNEUMONIA, ETC.

In 1843 epidemic influenza, or *Tyler Grippe*, was generally prevalent—hundreds of cases occurred in the city; since that date pneumonia has been more common. Season has much to do in the production of bronchitis and pneumonia, these diseases being far more prevalent in winter and spring than during the summer and fall months. During the years 1847 and '48 typhoid pneumonia was very prevalent.

CEREBRO-SPINAL MENINGITIS.*

During the years 1863, '64 and '65, the "spotted fever," so-called, was a frequent and most deadly visitor, and whenever a case occurred in a neighborhood, the most intense alarm followed its announcement.

The mountain districts of West Virginia have been most frequently visited by this disease, and the season of its greatest prevalence, the cold weather of January and February. On its first appearance it proved fatal in almost every case; but subsequently it assumed a milder character, and many patients were saved. Recoveries occurred under very different plans of treatment, but

*This disease is said to have appeared so long ago as 1804, in Dana, and in 1806, at Muford, in New England, and was, about that time, described in the published papers of the Massachusetts Medical Society. In January, 1812, a description of this epidemic was published in the *London Medical Review*.

the greatest success followed, I believe, the free use of opium, stimulants and blisters.

ENTERIC OR TYPHOID FEVER.

About the year 1843 enteric or typhoid fever presented itself in unmistakable form, and demanded supporting treatment. Prior to that period, intermittent and remittent fevers were common, but since then they have been entirely replaced by the enteric or typhoid form, which, however, under different names, had long before been known to the profession in eastern Ohio.

Dr. W. J. Bates, whose earliest experience in the profession was earned in eastern Ohio, and whose practice in Wheeling now covers a period of 30 years, says:

"In the year 1835 a fever prevailed in the northwestern part of Jefferson county, Ohio. The first cases occurred in the family of James Kinsey, in which five or six deaths took place in rapid succession; and from this fact the disease obtained the name, among the people, of '*the Kinsey fever*.' Sometime between 1840 and '45 a very fatal epidemic prevailed in the northeastern part of Harrison county, Ohio, called the '*Seceder fever*' because many families were speedily attacked after attending communion service at a country church, near the village of New Athens, belonging to the sect of Seceders. This disease bore so marked a resemblance to the '*Kinsey fever*' as to make it certain that it belonged to the same class.

"The treatment employed was venesection, calomel, blistering and the heroic plan generally, and *three-fourths* of the cases proved fatal."

During the *transition period* a blending of types was frequently witnessed, particularly in localities which were parts of former marshy districts.

The first wide-spread visitation of this fever in West Virginia began in 1847,* and continued in malignancy and fatality for the next six years, after which it gradually declined in frequency, and at the same time became more manageable.

Since 1853, it has been wandering through the different counties and neighborhoods of the State—at one time mild, at another severe; attacking one neighborhood this year, another the next, and then, perhaps, returning to the locality it scourged the year before.

* This epidemic is described in the author's *Practical Treatise on Enteric Fever*—Philadelphia, 1859—pp. 73—100. See also *Remarks on the Contagiousness of Enteric Fever*, published in the "*New York Medical Record*," April No., 1869.

So common, in fact, has the disease become since 1847, that I doubt if at any time the country has been entirely free from its presence. From 1864 to 1869 constituted another cyclic visitation, and during this period of unusual frequency of occurrence, the disease, in many localities, presented a very malignant and fatal character, but not to be compared with the uniform malignancy and fatality of the epidemic which made its appearance in 1847, and reached its acme in the winter of 1851 and '52. At the very beginning of my practice, I was rushed into the midst of this, the most fearful visitation of enteric fever it has ever been my fortune to witness ; and I know nothing in medical history concerning its prevalence and fatality in this country to exceed the wide-spread scourge to which I allude. Indeed, in many lamentable particulars, it resembled some of the fever epidemics which have prevailed in Ireland, and so graphically described by the never-to-be-forgotten Dublin professor, Dr. Graves.



